



EDITORIAL
LIBRARY

Fast Online and Web Connections

ISDN

PC Labs Compares the Latest Technology

ADSL

And Reviews Six ISDN Adapters

CABLE MODEMS

Network Printing Eleven New Models Offer a Printer for Every Price Range

Gateway Destination The First True Family Room PC

MAGAZINE

ONLINE

SERVICES *in an*

PC LABS TESTS

Online
Paths
To the
Web

INTERNET WORLD

- ★ **America Online**
- ★ **CompuServe**
- ★ **Microsoft Network**
- ★ **Prodigy**
- ★ **WOW! and More...**

CompuServe

AMERICA
Online

prodigy





**THANKS TO A
BRAND NEW
TECHNOLOGY CALLED
CROMACLEAR,**

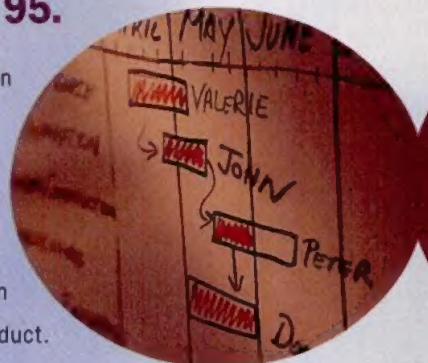


CIRCLE 157 ON READER SERVICE CARD

to guide your project down a clear path

Microsoft Project for Windows 95.

Now you can manage projects more simply, more smoothly, by communicating project information as it occurs. With Microsoft® Project you can convey project status quickly and effectively so your boss, customers, and coworkers are always in the loop. From sharing task deadlines and responsibilities, to letting people know about changes and the impact they'll have on the deadline, you have the tools to organize your projects into manageable steps and keep them moving in the right direction. Microsoft Project unlocks the doors of communication and gives you the power to navigate the most efficient route to a successful end product.



Graphical views let teammates visualize where the project is going. •

With Microsoft Project you can display project data in ways that everyone can understand. Great-looking Gantt Charts integrate text, timelines and graphical bars so everyone can see start and finish dates, inter-dependencies and task assignments. Throughout your project, you can also use a Monthly Calendar report to share your plan in a format that's clear and easy to read. And since Microsoft Project shares many of the same key commands with other Office applications, it will be easy to create schedules and reports. But if at any time you need help, type in a question and the Answer Wizard gives you the information you need. Microsoft Project helps you illustrate every phase of your project so you and your team keep your goals in sight.



Microsoft®

WHERE DO YOU WANT TO GO TODAY?™

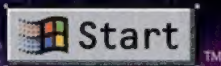


To see an autodemo and more, go to <http://www.microsoft.com/msoffice>. Or call 800-426-9400.

*Microsoft Project works with Microsoft Mail, cc: Mail,™ Lotus Notes® and the Microsoft Exchange Inbox for Windows 95. © 1995 Microsoft Corporation. All rights reserved. Microsoft, Windows, and the Windows logo are registered trademarks and the Windows Start logo and Where do you want to go today? are trademarks of Microsoft Corporation. cc: Mail is a trademark of cc: Mail, Inc. a wholly owned subsidiary of Lotus Development Corporation. Lotus Notes is a registered trademark of Lotus Development Corporation.

Keep everyone moving on the same track with open lines of communication.

Microsoft Project is completely integrated with a wide range of e-mail systems* and Schedule+ so that with a single click, changes and additions are immediately distributed to and from teammates. Assignments, task changes, and progress can be communicated and updated without ever reentering information, so you save time and eliminate mistakes. And because Microsoft Project is a member of the Office family, sharing data between programs is easy. For example, you can start building a schedule by simply dragging a task list out of Microsoft Excel and dropping it directly into your Microsoft Project plan. You keep communication clear and information consistent and your project continues to move exactly the way you planned.



Now you can take full advantage of Windows 95.

Microsoft Project is the world's best selling project management software and now is optimized to work hand-in-hand with the 32-bit performance, advanced multitasking, and simplified user interface of the Windows® 95 operating system. Together, they help open the lines of communication. Together, they help you enhance the way you manage your projects.

**TECHNICALLY
EXPLICIT
MATERIAL
ENCLOSED**



Includes Internet Access Software!
COMPLETE TEXT OF PC MAGAZINE OCTOBER 1993 TO OCTOBER 1994

INCLUDES PC MAGAZINE Winstone 95, WinBench 9.0

PC Magazine CD—the most innovative PC tool ever developed.

Now 30% off when you subscribe!

It's one thing to read about cutting-edge technology. Now, with PC Magazine CD—the on-screen companion to PC Magazine—you can see, hear and interact with it.

Just one click lets you: Walk through the newest software suites...download PC Bench 9.0, Winbench 95 and Winstone 95...pull up data and results not available in print or online...experience exclusive multimedia product demonstrations...get working samples of real applications to run on your system...access everything ever published in PC Magazine during the previous 12 months.

All this at our lowest-time-ever rate of just \$49.95 for four power-packed releases—30% off the single-disc price! Call right away to start your subscription to PC Magazine CD. There's nothing else like it on the market today!

Call: 1 800-335-1195

Mention Priority Code BFAA

P.O. Box 59494 • Boulder, CO 80332-9494

Inside

Have you noticed how fast everything is changing? The emergence of the Internet is speeding things up like never before. People talk about things happening in "Internet years"—which seem to last no longer than about three months.

Just look at what has happened to online services like America Online, CompuServe, and Prodigy. A year ago, Internet access was an interesting but minor extra that the online services offered. Today, access to the

ture of online services in an Internet-centric world.

Take a look at the changes in connecting—whether to the Internet, to an online service, or just back to your office on a dial-up line. A year ago, we were just starting the move to 28.8-Kbps modems, and ISDN was a relatively obscure offering. Now 28.8 is standard, ISDN is becoming more commonplace, and everyone is talking about new alternatives like cable modems, satellite broadcast, and ADSL. Our feature story "Fast Connections" sorts out your options.

As things keep changing, we've also changed and updated our online presence. At PC MagNet, our service on CompuServe, we now have more discussion forums than ever. When you visit, you get the chance to talk with our authors and with the developers of many of the products about which we write. In addition, we recently enhanced our Web site, <http://www.pcmag.com>, with a new PC Labs Online section, from which you can download the latest results of our product testing. PC Labs Online joins InternetUser, our guide to the ever-changing world of Internet software and sites, as well as our daily Trends updates and columns.

—Michael J. Miller



Internet and the organization of content on the Internet are rapidly becoming some of the primary features. Additionally, all three of the major services, along with the newer Microsoft Network, have introduced or are introducing new services that use the Internet as the core of their content.

A year ago, we were talking about new entrants in the field, such as Interchange and eWorld. Now, both have replaced their original guises with Internet-oriented services. In our cover story, "Online Services: Adapting to the Web," we examine the fu-

PC Magazine, ISSN 0888-8507, is published twice a month except in July and August, for \$49.97 for one year. Ziff-Davis Publishing Company, L.P., One Park Ave., New York, NY 10016-5802. Second-class postage paid at New York, NY 10016-5802 and at additional mailing offices. POSTMASTER: Address changes to PC Magazine, P.O. Box 54093, Boulder, CO 80322-4093. GST registration number: R-123669673; in Canada, R140496720. Canada Post International Publications Mail Product (Canadian Distribution) Sales Agreement No. 266477.

VISUAL OBJECT COBOL FOR

WINDOWS 95 AND NT.

NOW THERE'S NOWHERE YOU CAN'T GO.



Introducing Visual® Object COBOL™ for Windows® 95 and NT. Its cool 32-bit development environment lets you quickly build advanced Windows 95 applications. Bring the power of COBOL to the internet by using HTML forms as your user interface—it's as easy as Accept/Display. Connect to ODBC databases. Even access desktop applications like Word and Excel through OLE Automation.

Visual Object COBOL: A complete development environment for advanced Windows programming.



Get your copy of Visual Object COBOL now for only \$499. Visit the Micro Focus WebStore at <http://paowebstore.microfocus.com/> or call Micro Focus at 1-800-551-5269.

MICRO FOCUS®

A Better Way of Programming™

CIRCLE 058 ON READER SERVICE CARD

NEW
WINDOWS 95
Version Now Available!

MAKES ALL RETYPING OBSOLETE.



OMNIPAGE PRO: THE WORLD'S MOST ACCURATE OCR.

Step one: Scan a document.
Step two: Press a button to
convert that document into
editable text and images for
your favorite applications.

WHAT'S NEW IN OMNIPAGE PRO FOR WINDOWS 95

- Microsoft Office Compatible
- Integrates with your favorite image editor
- New easier-to-use AutoOCR Toolbar™
- Read faxes directly from Microsoft Exchange
- Automatic OCR scheduling
- HTML output jump starts moving pages to the Web
- OLE 2.0 support, and more



Sound easy? It is. OmniPage® Pro is the world's most accurate Optical Character Recognition (OCR) software, turning your scanned pages into usable, editable text and graphics in seconds.

So now you can accurately enter your letters, faxes, reports, even articles into Word, WordPerfect, Excel, Lotus 1-2-3, PageMaker and many other applications without ever having to type a single word. OmniPage Pro is now available for Windows 95 and

Windows 3.1. Which means that—no matter which operating system you use—you can take complete advantage of the most accurate OCR

software in the world today.

Call us now to order a copy of OmniPage Pro, or simply visit a local reseller.

And then you can really start using your scanner for all it's worth.

“OmniPage Pro is the longtime OCR leader for good reason. It's simple, fast and the most complete package around.”

PC Computing—December 1995



SPECIAL UPGRADE

\$129*

If you have any OmniPage or WordScan product, including those bundled with your HP or other scanner, upgrade to OmniPage Pro for these benefits:

- 65% more accurate
- 35% faster
- New, easier-to-use interface
- True Page® retains text & graphics in their original layout



74% off regular price

Visit a local reseller or call today!

800-736-5735

extension 10

[www.caere.com]

*Suggested price US dollars—subject to change without notice. Caere, the Caere logo, OmniPage, WordScan and True Page are registered trademarks and AutoOCR Toolbar is a trademark of Caere Corporation. All other names are the property of their respective holders. © 1996

CIRCLE 292 ON READER SERVICE CARD

UP FRONT

Inside

What's that in Web years? ...4

Letters

Places to go, sites to see ...19

Trends

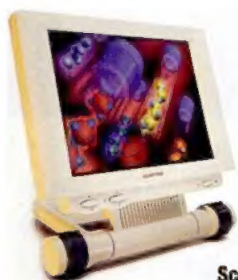
- ▶ Mainstream Windows NT
- ▶ Netscape's Notes challenger
- ▶ The big battle over tiny storage cards
- ▶ Is your company watching your Web usage?31

Pipeline

A passion for personal computing, Mac-style37

First Looks

- ▶ CorelVideo
- ▶ Microsoft Exchange Server 4.0
- ▶ Four financial Web sites
- ▶ Jammer Professional39



Sceptre's CD-1112T LCD: The desktop monitor of the future (page 63).

Second Looks

Speeding Up WinFax 7.0...69

COLUMNISTS

Michael J. Miller

From the Editor-in-Chief ...29

Bill Machrone

Breaking the Law83

John C. Dvorak

It's the Internet, Stupid85
Inside Track87

Jim Seymour

Underestimating the Need for Power91

Bill Howard

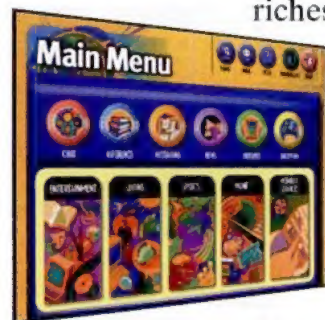
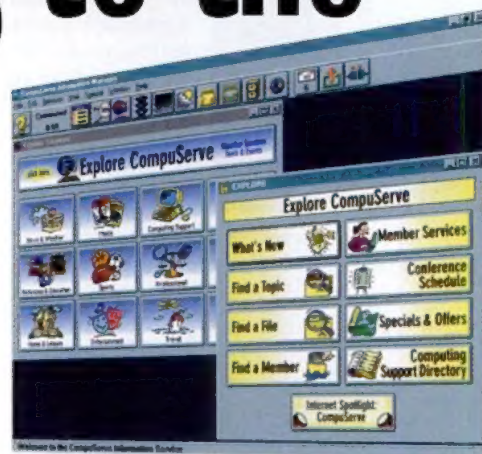
The Forces Behind Convergence93

COVER STORY

Online Services

Adapting to the WEB

BY RICK AYRE AND THOMAS MACE Can online services survive in the shadow of the Web? Our evaluation of the five biggest ones shows that they are alive and kicking but changing radically as they adapt to an Internet-enabled era. In addition to their traditional role as content providers, communication centers, and community builders, the best online services are roadmaps to the riches of the Internet.



They are also migrating onto the Internet, a move that heralds the end of online services as closed, proprietary networks. We review America Online, CompuServe, The Microsoft Network, Prodigy, and WOW! from CompuServe to see which can serve you best in an open, interconnected world100

America Online.....	103
CompuServe	114
The Microsoft Network.....	118
Prodigy.....	130
WOW! from CompuServe.....	140
How to Read the Suitability to Task Boxes.....	102
Editors' Choice.....	103

The Internet Connection.....	107
Hot Name-Brand Content.....	108
AOL's Global Network Navigator.....	112
SpryNet: The Internet from CompuServe.....	114
Online Services: Comparing the Costs.....	116

Shakeouts in the Shadow of the Web.....	120
MSN's Outpost on the Web.....	130
Avatars and Virtual Worlds: The State of the Chat.....	132
Prodigy's Multiple Web Presences.....	136
Summary of Features.....	139

FEATURES

Connectivity

Fast Connections



BY LES FREED With content on the Internet erupting from plain text into dazzling multimedia, your 28.8-Kbps modem connection is bound to feel uncomfortably slow. Plain old telephone lines may have hit their peak, but new high-speed digital technologies—ISDN, ADSL, cable modems, and satellites—promise lightning-fast access to online services and the Internet. We review six

ISDN terminal adapters that give you fast access today and analyze plans for the megabit-per-second networks of tomorrow143

Adtran ISU Express	163	Editors' Choice	145
ISDN*tek CyberSpace		An ISDN Glossary	148
Internet+Plus Card	166	Should You Turbocharge	
Mitsubishi NetViper	170	Your Telecommuters?	150
Motorola BitSurfer Pro	170	Suitability to Task	152
3Com Impact	177	Another Route to ISDN	157
U.S. Robotics Sportster		Performance Tests	160
ISDN 128K	181	Summary of Features	169
Fast Connections Compared	144	Getting Connected	174



Hardware

Share and Share a Lot

BY ALFRED POOR The latest additions to the workgroup and departmental laser family of printers now offer more connectivity options than ever; they're also easier to set up and operate. The printers in this roundup feature a wide array of networking features such as internal multiprotocol print servers and sophisticated remote-management software. Network administrators and end users now have more control over what comes out of the printer right from the desktop. We test 11 printers that range in speed from 12 pages per minute to 40 ppm in order to help you find the right solution for your workgroup or department185



Dataproducts Typhoon 40	192	Pull vs. Push: Network	
HP LaserJet 5M	193	Printing on NetWare	187
HP LaserJet 4MV	193	Editors' Choice	191
HP LaserJet 5Si MX	193	Summary of Features	194
Lexmark Optra R+	200	Output Samples	198
Lexmark Optra LXi+	200	NDPS: New NetWare	
Okidata DL 1200/PS	210	Printing Architecture	200
QMS 2425Ex Print System	212	HP's PCL 6:	
QMS 3825 Print System	212	The Next Step	204
Xerox DocuPrint 4517mp	215	Performance Tests	208
Xerox 4520mp	215		

PC TECH

Java Tools: Waking Up the Web

BY JOHN LAM Hotter than your morning coffee—that's Java. But why is it so popular? And just how easy is it to create Java applets? We take a look at the Java language itself, the Java Development Kit, and two tools that make creating applets easier221

Tutor

BY JEFF PROSISE Researching with the Web: How to find exactly what you're looking for on the Internet—lickety-split235

Power Programming*

BY PAUL BONNER A VB 4.0 add-in lets you save toolbars for use in future projects245

Inside OS/2*

BY LINDEN DE CARMO Creating a multimedia CD player using REXX: Unleash your system's dormant multimedia capabilities267

Utilities*

BY JOHN LAM Hotkey Detective lets you manage shortcut keys in Windows 95281

PC SOLUTIONS

User-to-User*

BY NEIL J. RUBENKING An easy way to launch a DOS session from any Windows 95 folder; another hidden Windows keyboard shortcut; the warm reboot feature in Windows 95; the Windows 95 Easter Egg307

ASK OUR ADVISORS

Hardware

What you can do if your printer lacks a page-eject button312

Operating Environments*

A batch file that changes directories in sequential order312

Word Processing

Inserting logos and letterheads in Word-Perfect files316

Spreadsheets*

Getting Microsoft Excel to act more like a three-dimensional spreadsheet program with cross-sheet references in multisheet workbooks322

Databases*

If you don't have the Access for Windows 95 Developer's kit, you can use these Access functions to emulate spinner controls322

Graphics

Why you need premastering software for developing your own CD-ROMs330

AFTER HOURS

A Little Bit of Everything

Terra Nova: Strike Force Centauri387

VR Headsets: Ready for Prime Time?

Forte VXF1 Headgear388

Virtual Reality System388

VictorMaxx CyberMaxx 2.0388

Head-Mounted Display388

Virtual i-O Virtual i-glasses392

Quick Clips392

A Classic Reborn:

Sid Meier's
Civilization II393

The 'Bots Are Back:
Descent II393

Abort, Retry, Fail?

BY DON WILLMOTT400



Get into your games with VR headgear (page 388).

PC MAGAZINE BEYOND PRINT

PC ONLINE Downloads

PC Magazine Downloads Area

- Download Area
- PC Magazine Utilities
- PC Tech Archives

The newest PC Magazine Utility, Checkers, lets you challenge a human opponent or pit your skills against the computer. Also: an index of utilities presented from 1991 - date.

PC Tech Archives
The volume archive for the May 14th issue of PC Magazine includes all the best equipment in the PC Tech and Hardware sections.

WWW.PCMAG.COM



What's New Online

Looking for a utility? Wondering where on the Web you can go to get some top-notch shareware? You're bound to find great solutions to some of your toughest computing challenges at PC Magazine Online's Download site, where you can instantly access all of PC Magazine's utilities, look over the entire 2D Net Shareware Library, and also get copies of PC Labs' latest benchmark tests. In addition, you'll find the winners of the 1996 Ziff-Davis Shareware Awards.

What's New on the CD

PC Magazine CD's interactive modules let you experience new products and technologies in a unique way.

The Perfect PC

Interactive diagrams of 8 ideal systems.

The Ultimate Utilities

Try over 125 Internet and desktop tools.

Multimedia Authoring

Compare video reviews of the hottest products to create your own CDs.

PowerHouse PCs

Review the latest home PCs using full-motion videos and interactive reviews.

Pentium Alternatives

Our Web-based feature includes benchmark test results and interactive reviews.

Utilities and software: WSearch identifies files and text, PICAAlbum finds bitmaps, SCInvoke monitors screen savers, CDPlayer controls CDs, and Checkers is fun.

A full year of PC Magazine in searchable format.

To order, call 800-335-1195 in the U.S. and Canada or 303-665-8930 elsewhere.

The Perfect PC

Imagine a PC with just the components you want. Experience our interactive designs for the Perfect PC in eight categories.

The Ultimate Utilities

Over 125 guided tours of desktop utilities and more programs, Internet registers, and more.

PC Magazine's 1996 Benchmark Tests

Analyze your system's performance using popular applications & standardized tests.

The PC Magazine Database

A complete year of full-text references covering April 1995 to April 1996.

Utilities and Software

Essential files and tools, find information, control screen savers, and CDs, and other utilities.

* Available on PC Magazine Online.

There is

no

corporate

address

code

for

ideas.



EPSON COLOR INK JET PRINTERS. Is there a place in the world of gray flannel and navy pinstripe for magenta and violet and ochre and jade? Well, there is now. Because now you can get 720 x 720 dpi of intense, Photo Quality color (and laser-quality text). We call it Epson Color. It's color that wins accolades. It's color that wins business. To see the Epson Stylus Color II, call 1-800-BUY-EPSON (ask for operator 3064) or visit us at <http://www.epson.com>. And see how much more effective color can be in your ideas, instead of your necktie.



720 x 720 dpi of real live, eye-widening Epson Color. It's like kicking and screaming and shouting for attention without all the kicking and screaming and shouting.

YOU'VE GOT TO SEE IT IN

EPSON

COLOR.



Editor-in-Chief Michael J. Miller

Editor Jake Kirchner

Executive Editors Rick Ayre, Bill Howard, Don Willmott

Executive Director, PC Labs C. James Galley III Art Director Laura Baer

Senior Networking Editor Frank J. Derfler, Jr.

Senior Editors Thomas Mace (Internet, PC Tech), Brian Nadel (First Looks), Sebastian Rupley (West Coast), Gail Shaffer (Networking and Communications)

Managing Editor Paul B. Ross Research Manager Judy DeYoung

Senior Associate Editors Leon Erlanger (Networking and Communications), Carol Levin (Trends), Sharon Terdeman (Technical Columns), Lance N. Ulanoff (Software) **Associate Editors** Jamie M. Bsales (Hardware), Michael E. Ryan (After Hours), Carol Venezia (PCs) **Assistant Managing Editor** Kim Schueler **Production Editor** Monica Sirignano **Copy Chief** Glen Boisseau **Becker Staff Editors** Holly Aguirre, Mary E. Behr, Yvonne Koulouthros, David Lidsky, Ellyn J. McCasland, John Morris, Michael W. Muchmore, Melissa J. Perenson, Sarah L. Roberts, Michelle Schoenung, Todd Spangler, Anush Yegazarian **Senior Writer** Robert S. Anthony **Staff Writers** Angela Hickman, Cade Metz **Senior Copy Editor** Joseph N. Levine **Copy Editors** Marian Berelowitz, Jill Léger, Gerard Mackey, Peter J. McLaughlin, Josh Miller, Ann Ovodow **Assistant Copy Editors** Regina Y. Kwon, David R. Lambert **Layout Manager** Linda Harms **Senior Layout Editor** Lillian Gaffney **Layout Editor** Barbara McGeech **Librarian** Nancy Sirapyan **Library Assistant** Dolores Williams **Editorial Researchers** Robert Daly, Simon T. Eskow, David Frank, Josh Levy, Arie Moller, Eyal Rabinovitch, Richard S. Shim **Editorial Assistants** Laura Lindhe, Mary Paulson **System Support Manager** Craig Ellison **Network Support Analyst** Melvin Acevedo **Production System Support Manager** Patricia Perkowski **Production System Support Analyst** Nancy Goodman-Slayback **Communications Manager** Diana Garelik **Assistant to the Editor-in-Chief** Tara Solon **Assistant to the Editor** Rita Aprahamian **Assistant to the Executive Editors** Christina M. Evelyn **Administrative Assistant** Christina Okang Sysop, PC MagNet Ken Hipple

Contributing Technical Editor Neil J. Rubenking **Contributing Editors** Bill Machrone (Editorial Director, New Products), Douglas Boling, Padraic Boyle, Bruce Brown, Brian Butler, Sheryl Canter, Ray Duncan, John C. Dvorak, Michael J. Mefford, Edward Mendelson, Charles Petzold, Stephen W. Plain, Tony Pompili, Alfred Poor, Jeff Prossie, John R. Quain, Sal Ricciardi, Steve Rigney, Winn L. Rosch, Joe Salemi, Jim Seymour, Richard Hale Shaw, Barry Simon, Luisa Simone, Craig Stinson, M. David Stone

Senior Associate Art Director Donna Panagakos **Associate Art Directors** Charles Conover, Richard Demler, Roger J. Greiner **Assistant Art Director** Le Chau (Betty) Thai **Associate Graphics Director** David Foster **Graphic Artist** Mark Tyner **Assistant to the Art Director** Frieda T. Smallwood **Contributing Photographer** Thom O'Connor

Director, PC Labs, West Coast Steve Buehler **Technical Directors** Ben Z. Gottesman (Software), Robert P. Lipschutz (Networking), Nick Stam (Hardware), Larry Seltzer (Internet, PC Tech) **Director, Operations** John R. Delaney **Project Leaders** Richard Fisco (PCs), Alex Ho (Network Edition), Jeff Mace (Graphics/Hardware), Jay Munro (Internet, PC Tech), Jeffrey G. Witt (Networking and Communications) **Associate Project Leaders** Laura Cox, Anatoliy Nosovitskiy, Dan Smith **Programmers** Richard V. Dragan, Kenneth Prakobchart **Product Testing Manager** Charles Rodriguez **Technical Analysts** Russell Iwanchuk, Amy Leung, Margaret A. Piemonte, Rick Rovegno, Denis Tom **Support Technicians** Bruce Deodat, Andrew Go, Oliver Kaven, Melanio Lopez, Jacqueline Paredes, Mark Valentine **Inventory Control Coordinators** Bryan Hughes, Rob Graydon, William Pagan **Administrative Assistant** Jennifer Blum

PC MAGAZINE CD

Executive Editor Peter McKie **Art Director** Curtis M. Fields **Associate Editor** Jae Yang

PC MAGAZINE ONLINE

Associate Editor Tin Albano **Senior Technical Editors** John Clyman, Amarendra Singh **Technical Associate** Thomas W. Giebel **Assistant Editor** Tracy Reppert

Publisher Daniel Rosensweig

National Associate Publisher Nancy Newman **Associate Publisher, Marketing** Susan Delman **National Sales Director** Vickie Pinsky **Business Manager** Chris Eisenhardt **Business Analyst** Christine Holsten **Events Manager** Dawn Gudelis **Manager, Promotion and Public Relations** Lynne Hasluck **Research Manager** Elyse Berman

Senior Advertising Production Manager Susan Conrad **Advertising Production Manager** Robert Joy **Assistant Advertising Production Managers** Barbara Adams, Ivis Fundichely **Editorial Production Manager** Pamela J. Berkowitz **Coordinator, Editorial Production** Louise Laberge

Advertising Office: One Park Ave., New York, NY 10016-5802; 800 33 MAG AD, 212-503-5100

Ziff-Davis Publishing Company

Chairman and CEO Eric Hippeau

Presidents Ronni Sonnenberg (U.S. Publications), Jeffrey Ballowe (Interactive Media and Development Group), J.B. Holston III (International Media Group), Bob Brown (Computer Intelligence/Infocorp), William Rosenthal (Training and Support Publishing Group) **Vice-Presidents** Timothy O'Brien (Chief Financial Office), J. Malcolm Morris (General Counsel and Secretary), Rayna Brown (Human Resources), Darryl Otte (Planning), Roger Herrmann (Production), Mark Moyer (Controller) **Treasurer** Thomas L. Wright

U.S. Publications Group

Presidents Ronni Sonnenberg (U.S. Publications), Claude Sheer (Business Media Group), J. Scott Briggs (Consumer Media Group) **Senior Vice-President, Circulation** Baird Davis **Vice-Presidents** Tom McGrade (Business Manager), Jim Manning (Marketing Services), Bob Bader (Central Advertising Sales), Mark Van Name (Product Testing), James F. Ramaley (Circulation Services), Don Byrnes, Al DiGuido, Daniel Farber, Michael J. Miller, Daniel Rosensweig, Paul Somerson **Executive Director, Licensing** Gertrud Borchardt **Director, ZD Labs** Bob Kane **Director, Benchmark Operation** Bill Catchings **Ziff-Davis Magazine Network: Vice-President/Managing Director** Joe Gillespie **Executive Director** Alicia Saribalis **Marketing Director** Mike Perkowski **Directors** Ken Beach, Michael Bird, Jeff Bruce, Kelly Lowman, Melinda Maginn, Debbie Moss, Julie Tuttle

Interactive Media and Development Group

President Jeffrey Ballowe **Executive Vice-President** David Shneider **Vice-President, Business Development** Tom Thompson **Vice-President, General Manager ZD Net** James Savage **Vice-President, ZDTV** Richard Fisher **Vice-President, Creative Services** Herbert Stern **Vice-President, Research** Elda Vale **Editorial Director, New Products** Bill Machrone **Group Business Manager** Jocelyn Grayson **Director, Public Relations** Gregory Jarboe

Ziff-Davis Publishing Company
A Softbank Company

Subscription Inquiries, Address Changes

Subscription Services: For subscription service questions, address changes, or ordering information, call 303-665-8930 in the U.S., 303-665-8930 in Canada, or 303-604-7445 elsewhere. You can send faxes to 303-604-7455, or 303-604-0540 outside the U.S. Or write to PC Magazine, P.O. Box 54093, Boulder, CO 80322-4093.

Subscription Rates: The subscription rate is \$49.97 for a one-year subscription (22 issues). Canada and all other countries, please add \$36.00 for postage.

Back Issues: For back issues (subject to availability), \$8 per issue (\$9 outside the U.S.), send check or money order to Back Issues Dept., Ziff-Davis Publishing Company, P.O. Box 53131, Boulder, CO 80322-3131.

PC Magazine CD: PC Magazine CD, the interactive CD-ROM companion to PC Magazine, is available quarterly. To order (\$49.95 per year in the U.S., \$72 in Canada, \$99 elsewhere), please call 800-335-1195, or 303-665-8930 outside the U.S. and Canada. Or write to PC Magazine CD, P.O. Box 59494, Boulder, CO 80322-9494.

Customer Lists: We periodically make lists of our customers available to carefully screened mailers of quality goods and services. If you do not wish to receive such mailings, please write to us at PC Magazine, P.O. Box 54093, Boulder, CO 80322-4093.

How to Contact the Editors

We welcome letters. However, we cannot look up stories from past issues, recommend products, or diagnose problems with your PC by phone. Send your written questions, complaints, and compliments to PC Magazine, One Park Ave., New York, NY 10016-5802. Please include a daytime telephone number. Send electronic mail to MCI Mail box 157-9301, to CompuServe address 72241,104, to Internet address 157.9301@mcm.com, or to PC MagNet (see below). PC Magazine's general number is 212-503-5255. The West Coast Operations number is 415-378-5500.

If you are dissatisfied with a product advertised in PC Magazine and cannot resolve the problem with the vendor, write (do not call) Beatrice Olivas, Advertising Department, at the above address. Include copies of your correspondence with the vendor.

PC Magazine does not accept unsolicited manuscripts. We will pay \$50 for Solutions and Programming user tips and for Abort, Retry, Fail? submissions. If you submit artwork or clippings with Abort, Retry, Fail?, mark up a photocopy, not the original.

PC Magazine Online



PC Magazine is on the World Wide Web (<http://www.pcmag.com>) and The Microsoft Network (Go To pcmagazine), and it operates PC MagNet, an online service of ZD Net, hosted by CompuServe. To join PC MagNet, call 1-800-895-4596 and ask for the PMZ offer, or set your communications software for 7 data bits, even parity, 1 stop bit, and full duplex. To find the number nearest you, dial 800-346-3247. (In Canada, dial 800-635-6225, voice only.) At the Host Name prompt, enter PHONES. Follow the menus, note the number closest to you, then hang up and dial the number. At the HOST NAME prompt, enter CIS. At the USER ID prompt, enter 177000,5000. Enter PC*MAGNET at the PASSWORD prompt and PCMCIS95 at the ENTER AGREEMENT NUMBER prompt. When you join ZD Net, you will be enrolled in both ZD Net and CompuServe, for a charge of \$13.45 a month. The connect-time charge is \$2.95 an hour, billed by the minute. For member services, call 800-848-8990.

To obtain the current utility on PC MagNet, type GO ZNT: FREEUTIL. You can also obtain it from our World Wide Web site, or you can download it from our anonymous FTP server at <ftp.pcmag.ziff.com>. You can receive the free utility on-disk by faxing your request to 508-368-0141.

Permissions, Reprints

Material in this publication may not be reproduced in any form without permission. If you want to quote from an article or use PC Magazine's logo in conjunction with an Editors' Choice designation, write Chantal Tucker or fax her at 212-503-5420; for information on reprints, please contact Ziff-Davis Reprints at 800-825-4237.

Editorial and Business Office: One Park Ave., New York, NY 10016-5802. Editorial: 212-503-5255; Advertising: 800 33 MAG AD, 212-503-5100.

The following are registered trademarks of Ziff-Davis Publishing Company: DOSMark, NetBench, PC, PC DIRECT, PC Labs, PC MAGAZINE, PC MAGAZINE AWARD FOR TECHNICAL EXCELLENCE, PC MAGAZINE EDITORS' CHOICE, PC MagNet, ServerBench, WinBench, Winstone, and ZD.

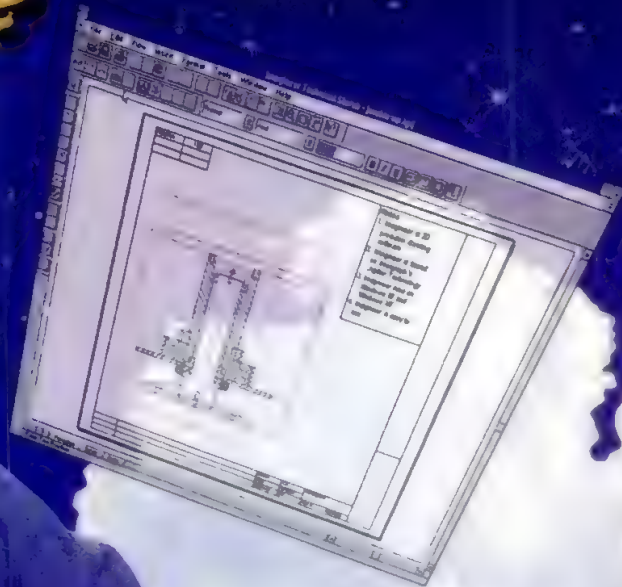
The following are trademarks of Ziff-Davis Publishing Company: Abort, Retry, Fail?, After Hours, BusinessCard, Corporate Developer, CPUmark, Extending Your Apps, Features Plus, First Looks, First Looks Plus, Lab Notes, New & Improved, OFF THE STACK, PC Bench, PC Magazine At Home, PC Magazine CD, PC Magazine MarketPlace, PC Solutions, PC Tech, Pipeline, Power Programming, Quick Clips, Read Only, ScreenDemos, Tech Notes, Tutor, User-to-User, WinDrain, ZDigit, ZD Net, and ZiffNet.

Other trademarks and trade names used throughout the publication are the property of their respective owners.

Except where noted, all PC Magazine reviews are of currently available products.

Copyright (c) 1996 Ziff-Davis Publishing Company. All rights reserved. Reproduction in whole or in part without permission is prohibited.

Ideas won't wait...



Capture your inspirations in a flash with Imagineer™



Why spend time wrestling with your software? Intergraph Imagineer™ Technical makes drawing fast and easy. Instead of complex commands, you get intuitive on-screen feedback. Imagineer's new way of drawing reduces mouse clicks, command changes, and keystrokes — so you stay in tune with your creative impulses.



Designed for Windows® 95 and Windows NT™

Imagineer is a Microsoft® Office Compatible 95 product. Combine drawings with text files, spreadsheets, presentations, and more.

Imagineer works with AutoCAD and MicroStation® files — *no messy translation necessary!*

Call for a **FREE** evaluation CD! Visit our Web site at <http://www.intergraph.com>

**Precision drawing!
made easy!**

Only **\$495** — call and order today!

800-692-8069

Mention priority code ZZ6.

CIRCLE 040 ON READER SERVICE CARD



INTERGRAPH
SOFTWARE SOLUTIONS



EXPLORE

Backup on CD

the possibilities...

RECORDABLE CD



Explorer™
CD RECORDER

Pinnacle Micro, the leader in optical storage technology, introduces the **new** Explorer™ CD Recorder for only **\$799**. This easy-to-use CD Recorder is perfect for all types of users.

As a CD recorder, you can create custom ISO 9660 and audio CDs holding up to 650 MB of data or 74 minutes of audio. As a 4X CD-ROM player, you can play thousands of educational, multimedia, and audio CDs. And, with the industry's only CD-R software connect to **Microsoft Backup**, the Explorer can be used to backup and archive data up to 1.3 GB on a single CD*. Each blank disc costs only \$15, or just 2¢ per megabyte.

Just as CDs have replaced tape cassettes in the music industry, CDs are now well on their way to replacing tape in the computer industry.

So go ahead and explore the endless possibilities with Pinnacle Micro's new **Explorer CD Recorder**. It's the best way to store, archive, distribute and create information on CD. To order or for the nearest dealer call **800.553.7070**



Call to receive your free
Guide To Compact
Disc Recordable (CD-R)

PINNACLE MICRO
THE OPTICAL STORAGE COMPANY

Tel: 714-789-3000 Fax: 714-789-3150 • <http://www.pinnaclemicro.com>

*Compressed. SCSI controller card sold separately. All trademarks and Registered Trademarks of Their Respective Owners.

CIRCLE 270 ON READER SERVICE CARD



*NEC Doesn't
Have It.*



*Sony's Is More
Expensive.*



TECHNITRON



free



MAG Innovation Co., Inc. • 2801 South Yale St., Santa Ana, CA 92704 • TEL 800-827-3998 or 714-751-2008 • FAX 714-751-5522 • MAGIC FAX-On-Demand 714-751-0166

©1996 MAG Innovation Co., Inc. All rights reserved. The following are trademarks of their respective companies: Colorific of Sonnetech, Ltd.; Kodak Color Management Software of Eastman Kodak Company; Trinitron and Multiscan of Sony. Star Guidelines for energy efficiency. Prices and specifications based on information published by the manufacturers as of 3/25/96. Actual price may vary. Specifications subject to change without notice. *All uses of Trinitron.

MAG-nified performance MAG-nificent color MAG-Trinitron®

Technitron™ is Trinitron® Plus.

Forget NEC and Sony. Your best value in hi-res color monitors with advanced Trinitron® CRT is Technitron from MAG InnoVision.

VERTICALLY FLAT — superb image quality and reduced distortion.

ULTRA FINE 0.25mm APERTURE GRILLE — super sharp focus and definition. The unique technology enhances brilliance and contrast to levels that other monitors can't match.



MAG InnoVision DX15T	Sony Multiscan 15ax	NEC MultiSync XE15	MAG InnoVision DX17T	Sony Multiscan 17a11	NEC MultiSync XV17+
0.25mm	0.25mm	0.25mm	0.25mm	0.25mm	0.25mm
14"***	13.9"***	13.8"***	16.1"***	16"***	15.6"***
MSRP \$459	MSRP \$529	ESP \$575	MSRP \$849	MSRP \$1,099	ESP \$849

***Viewable. (All Technitron monitors include: EPA Energy Star Compliant power management; SWEDAC MPR II compliant low emissions; 3-year Limited Warranty; award winning service (extended service plans optional); recyclable packaging; and no CFC's used in manufacturing.)

MICROPROCESSOR - based digital controls deliver unrivaled flexibility with Plug & Play ease for Windows® 95 compatibility.

NEC doesn't have it, Sony's is more expensive. For the best value in Trinitron® color technology — buy Technitron from MAG InnoVision. Discover why monitor buyers across the country are switching to Technitron — The Other Trinitron® from MAG InnoVision. **Call 1-800-827-3998 ext. 161** for the MAG Authorized Ultimate Reseller near you.



The Other Trinitron®

<http://www.maginnovision.com>

MultiSync is NEC Technologies, Inc.'s. Windows is Microsoft Corporation. All other trademarks are the property of their respective owners. As an Energy Star Partner, MAG InnoVision has determined that this product meets the Energy Star criteria for CRT technology only. The DX17T and DX15T use a Trinitron® CRT. Free Coloristic Color Management Software through June 30, 1996 for end users (\$49.95 retail value) included with monitor purchase.

CIRCLE 039 ON READER SERVICE CARD

**"Sooner or later,
something is going to make
your hard disk crash."**

—FORBES MAGAZINE

COMPUTER APPLICATIONS

EDITED BY DAVID C. CHURCHOCK

It could be a power surge, a bad piece of software or your 4-year-old: Sooner or later, something is going to make your hard disk crash. Protect yourself now.

Avoiding disaster

By Steve Kichen

THEORY: A computer's hard disk is utterly reliable. The engineers will tell you that it has a mean time between failures of 300,000 hours. Meaning: If you run your computer for eight hours a day, every day, the disk will crash in the year 2098.

Reality: It could crash next week, wiping out your tax records, your unfinished novel and the software you need to boot up the computer.

Protecting yourself will cost money and take time, but it's a form of insurance well worth having. Some causes of disk failure are easily preventable: a power surge, a brownout or an overheated computer. A basic uninterruptible power supply—which is fine for most home PCs—costs \$100 to \$200 and will run a computer long enough for you to close programs and turn off the system during a power outage. As for overheating, be sure that your computer's ventilation ducts are not blocked; if your computer is crowded with peripheral cards, get a \$20 internal fan card.

Another threat: computer viruses. Commercial viral detection and clean-up software, such as Norton AntiVirus for Windows 95, retails for \$79.15.

ing data, the disk could be corrupted. Indeed, there's a chance that you won't be able to start the computer up from that hard disk without correcting the bad data—and of course you can't correct bad data without getting your computer going.

The first thing is to make up a bootable disk—a disk, that is, with enough of the computer's operating system to enable the machine to turn on, get its bearings and listen to further commands. Norton Utilities for Windows 95 (\$130 for the CD-ROM version) includes among its many features a procedure for constructing an emergency boot disk. You

Protection

Disasters happen. In fact, they're more likely than you think. If you access the Internet, or share floppies, you expose your computer to the threat of viruses. If you add new software and files, you could push your computer beyond its limits. Either way, your documents are at risk.

Fortunately, Norton AntiVirus® and Norton Utilities® reduce that risk dramatically. Installed in minutes, they maintain a constant vigil, automatically preventing problems. They are by far the most popular anti-virus and utilities programs, and are relied on by 94% of the Fortune 100 for computer protection. After all, the alternative could be disastrous.

Norton AntiVirus

Norton AntiVirus protects against the very real threat of computer viruses, automatically detecting and eliminating viruses before they corrupt your system.



Norton Utilities

Norton Utilities is absolutely critical, automatically correcting problems and protecting your whole system, managing valuable disk space, and even recovering lost files after a crash.



To purchase, visit your local software reseller. For more information, call 1-800-822-6417, ext. 9NA2 or visit us at www.symantec.com.

Available for Windows and Macintosh. (SAM® for Macintosh virus protection.)

**Protect yourself.
Protect your friends.**

SYMANTEC.

Letters

CATCHING THE WAVE

I just received my first issue of *PC Magazine*, featuring "The 100 Top Web Sites" (February 6, 1996). Since I'm new to the Internet and the World Wide Web, this issue provided some great territory for me to explore. In my first session, I toured the United Nations and the Rock and Roll Hall of Fame. I downloaded art from the Louvre and visited the Library of Congress. Last, I checked out the Consumer Information Catalog. I did all this in less than half an hour. This one issue was well worth the price of subscription.

JIM RESKE
Ellicott City, Maryland

I was somewhat surprised and disappointed when I viewed your issue on the top 100 Web sites. You failed to include a category on the most important and fastest-growing category of Web sites: businesses that are using the Net to promote and market their products. For example, Budweiser, Monsanto, and Southwest Airlines all have outstanding and useful sites.

SAM OTTENLIPS
Fenton, Missouri

As an avid Internet searcher, I enjoyed your review of the top 100 Web sites. However, as an information specialist, or a "cranky librarian" as you put it, I was very disturbed. *Cybrarians*, as we are often referred to, were some of the earliest people to go online and continue to be some of the heaviest users and designers of Web pages.

DAPHNE BRUCE
via the Internet

I enjoyed the cover story on the top 100 Web sites; it was even better than last year's article. Your review encompassed a wide variety of sites with solid information and humor. Kudos to all who contributed to the article.

LAURA DIXON
Utica, New York

Your article about the top Web sites was a good way for me to get a condensed version of what is available on the Net. It would have been better, however, to add a side note about which sites work best for those of us with 14.4-Kbps modems. The flash of a graphics-heavy Web page is certainly a good way to catch someone's attention on the Web, but people like me will usually avoid pages with graphics that take way too long to download in favor of a text page.

STEPHAN GAUTIER
via PC MagNet

STILL CONFUSED?

I found your sidebar "Still Not Connected?" (February 6, 1996) to be misleading. Your de-



Since I'm new to the Internet, this issue provided some great territory for me to explore.

scription of CompuServe's "proprietary Net-Launcher browser" leads the reader to believe that it is the only browser that works with CompuServe. In fact, CompuServe users can use any Winsock-compatible browser, including Netscape Navigator.

ETHAN BLANTON
via PC MagNet

While I enjoyed your cover story on the top Web sites, I was disappointed to find that you misrepresent both CompuServe and Prodigy in the sidebar "Still Not Connected?" when you make an unbalanced comparison of their monthly rates. You list America Online's lowest monthly rate yet neglect to list CompuServe's and Prodigy's best subscription prices. If I, as a consumer, was just looking at the cost issue, I would not even begin to explore what CompuServe or Prodigy has to offer.

THERESA A. PARRETT
via PC MagNet

TRACKING THE SOURCE

John C. Dvorak is correct in saying that Sony had no clue how to market its first computers, although I disagree with some of his other statements (Inside Track, February 6, 1996). Sony's SMC-70 had dual 3.5-inch disk drives in 1982 and used this system to engineer interactive laserdisk drives and Trinitron monitors. This is all research that has found its way into the multimedia computers of today. So to say that Sony's new machines will have "minimal" engineering is forgetting who invented the light bulb.

BOB MEDEIROS
via the Internet

HAPPINESS IN OS/2

Thank you for the excellent reviews of three OS/2 applications in First Looks (February 6, 1996). I would be very happy to see more such reviews, as a great many people don't realize that there are some good OS/2 native applications available.

RAYMOND F. CLEVELAND
via PC MagNet

I just started getting your magazine again and I am very happy to see that you are giving some attention to OS/2. It seems that you used to give only Windows support.

GEOFF LENOIR
San Antonio, Texas

THE BEST WAY TO BUY

As an employee of a computer store, I often recommend your magazine to customers wishing to gain further insight into the world of computing. However, I found Jake Kirchner's Pipeline column "You Can't Get a Cold Beer in a Computer Store" (February 6, 1996) to be full of opinion and bias. I'll be the first to admit to a customer that mail order is the right way to go for some people, yet retail stores will always hold an advantage for a vast portion of consumers.

MIKE LEUZINGER
via the Internet

Kirchner seems to think that retail outlets are fine only for those of relative technical naivete. In fact, there are many of us out here who know our hardware yet choose to deal at the retail level for convenience and time savings. We purchase locally not out of a need for hand-holding, but because it allows us to get our work done with minimal interruption and aggravation.

JIM ATANASOFF
Frederick, Maryland

Kirchner neglects to mention the millions of people who buy direct and then go to the retailer for hand-holding and information. Many of these people visit the retailer first for advice and demonstrations, then buy direct to save money when they should really have the courage to do their own research. The retailer is in business to sell products, not provide free advice.

JOHN PINKERTON
via the Internet

MYSTERY SOLVED

In his column "The Case of the Wasted Clusters" (February 6, 1996), Jim Seymour laments the trade-off between cluster and partition sizes and mentions Windows NT and OS/2 Warp as exceptions to this. It's important to note that Novell's NetWare has not



Pro Devices, Inc., and combinations thereof, with Windows and Windows
Advanced. All other names are the property of their respective holders.

AMD CPUs ARE ENDORSED BY 85 MILLION PEOPLE (AND THEY DON'T EVEN KNOW IT).



AMD's family of 586 CPUs, including the new AMD5K86-P90, are the leaders in price/performance for their class.

Designed for



Microsoft®
Windows®95

The AMD5K86-P90, is designed for flawless Windows 95 compatibility.

If you want to run with a proven processor, consider this: more than 85 million PCs worldwide have run with an AMD CPU. In fact, we're the second largest processor manufacturer in the world. Today, you'll find us running Windows and Windows 95 compatible systems sold by the top names in the business. And while you may not know it, that's helpful inside information when it comes to finding computers whose value stands out in a crowded market.

1-800-222-9323 Internet: <http://www.amd.com>

CIRCLE 075 ON READER SERVICE CARD

AMD 
Run with it.

Letters

had this drawback for years, predating OS/2. Additionally, Version 4 of NetWare has a feature called block suballocation, which reduces wasted disk space even more.

ED SAWICKI
via PC MagNet

The way I see it, there is no excuse for having multiple logical partitions just to get around limitations in the operating system. The convenience of having all your stuff in one disk-drive-letter address far outweighs the loss to cluster over-byte. I have used DoubleSpace and DriveSpace since they were introduced and have had no problems with them. The bottom line is that I don't have to worry about cluster size anymore.

PETER F. WELLS
via PC MagNet

ROOM IF YOU WANT TO

It was a pleasure to read the recent article "Wireless LANs: Free to Roam" (February 20, 1996). I have been a believer in the validity of wireless LAN extension for over a year now and am heartened by your excellent coverage of it. I applaud *PC Magazine* for bringing noncellular wireless a bit further into the mainstream of LAN technology.

ED COCKS
Denver, Colorado

...AND A CHERRY ON TOP

I enjoyed Bill Howard's excellent column "Accessorizing Your PC" (February 20, 1996). Sony has an answer to the multimedia speaker control problem he described. The very nifty CSS-B100 Computer Speaker Sys-

HOW TO CONTACT US

We welcome your comments and suggestions. Please send Letters to the Editor via

THE INTERNET 157.9301@mcimail.com

COMPUSERVE 72241,104, or to individual editors as listed on ZD Net (type GO PCMSTAFF)

FAX 212-503-5799

MAIL Letters, *PC Magazine*, One Park Ave., New York, NY 10016-5802

All letters become the property of PC Magazine and are subject to editing. We regret that we cannot answer letters individually. To send submissions for PC Solutions, please see the sidebar "How to Contact Us" on the second page of that column.



CORRECTIONS AND AMPLIFICATIONS

In the "Information Manager Picks and Pans" section of our "Good-Bye, Rolodex! So Long, Sticky Notes!" feature (page 166, April 23, 1996), the thumbs up/thumbs down icon for the Microsoft Schedule+ for Windows 95 image in the lower-left corner should have been a thumbs up, indicating a positive feature.

The Trends story "Beating the Markets—While Fly-Fishing?" (page 37, April 23, 1996) incorrectly identified Dow Jones as being in partnership with Omega Research to distribute Omega's investment software to investors. Telerate, an independent subsidiary of Dow Jones, will make the software available.

In the First Looks review "Financial Analyst: The Textbook Answer to Practical Business Computation" (page 48, April 23, 1996), the 800 number was listed incorrectly. The correct number is 800-262-4729.

tem sits under the monitor and features a set of speakers, two complete sets of inputs and output jacks, bass and volume controls, a power switch—everything. It's the best money I've ever spent.

STEVEN SALEMI
via PC MagNet

I use a variation on Howard's phone-switch idea to hook up two of my PCs to one Zip drive by way of a parallel port data-transfer switch. It's a primitive network of sorts whereby each PC can share the Zip drive, depending on whether the switch is in the A or B position; it also enables both computers to share the same printer.

RICK DOOLING
via PC MagNet

I found Howard's column to be a puff piece. A more critical view of the industry is required. I suspect that people who purchase the products he named may eventually have to buy upgrades to be completely satisfied with their initial purchases. Personally, I'm tired of having to pay for an upgrade just to get the original product to work like it should have in the first place, and I don't see anything to indicate that the industry is addressing this issue.

GARY LEACH
Warsaw, Poland

FINDING WHAT WORKS

Your PC Tech article "Windows 3.1 Memory Enhancement Utilities" (February 20, 1996) was thoroughly helpful in providing empirical evidence of these products' performance, or lack thereof. One aspect of memory managers that you did not adequately address, however, is their effect on system stability, which I have found to be a major factor in evaluating the practical usability of these products.

TOBIAS IACONIS
Beverly Hills, California

I agree wholeheartedly with your review of SoftRAM 95. When I installed SoftRAM, it said I had all sorts of memory available and it enabled me to run memory hogs such as SimCity. But it caused general protection faults every time I used any application. Even after uninstalling, I couldn't get an ac-

curate reading of my memory resources.

ERIC ROBERTS
via the Internet

How nice of you not to abandon those of us who are sticking with Windows 3.1 for the time being. Your coverage of memory enhancement products was very helpful.

ALAN COOPER
via the Internet

Thank you and congratulations on your comparison of memory enhancers. It confirmed the impression I already had from my own experience: Quarterdeck's MagnaRAM 2 does not help much. Your lab tests and product comparisons are my most important source of reliable information. Now I am immediately going to dump MagnaRAM 2 and buy Hurricane, your Editors' Choice.

EDWIN HATTENSCHWILER
Zurich, Switzerland

WHEN I GROW UP...

Bill Machrone's column "Engineers: The Next Generation" (February 20, 1996) is right on. Many times just something as simple as generating interest in a science like electronics can create interest in different careers.

DON LANDGRAF
via PC MagNet

TAXING EXPERIENCE

Regarding "Taming the Tax Beast" (February 20, 1996): I agree that the TurboTax interface is attractive, but so what? With all the screen space that is allocated to oversized borders, tabs, and buttons, the real substance of the program is squeezed into tiny windows. This forces the user to do a lot of scrolling to get to the questions. I fear that your compliments on interface will encourage software developers to concentrate on what is attractive rather than on what is practical.

DICK TOLER
via PC MagNet

A fine, well-written article on tax software. I have used TurboTax since it first came out, and it is everything the reviewers say it is.

DON WHITE
via PC MagNet



Simple
solutions...

...for global
communications.



NewCom brings you together.

You're in New York. Your design team is in Tokyo. With remarkable Digital Simultaneous Voice Data modems (DSVD) an ordinary analog phone line is all you need to collaborate. No expensive ISDN or T-1 lines needed, no quirky, hybrid modems; it's easily configured. Talk and send/receive data at the same time. Duplex technology makes voices from halfway around the world sound like they're next door. And NewCom quality modem design speeds your data at rates up to 28,800 Kbps.

The NewTalk 2000 family of DSVD modems for embedded applications responds instantly to the

demands of virtually all applications, from spreadsheets to word processing, from page design to multi-media. And at the end of the day, use NewTalk's remote gaming applications for remarkably lifelike game play with competitors on all parts of the globe.

NewCom also manufactures superior full duplex Speakerphone, Voicemail and Data/Fax modems for PC's in a configuration that's just right for your business or home.

Call 1-800-5NewCom.



NEWCOM™

Your.lift.2.the.info.superhwy.

NewCom, Inc., a subsidiary of Aura Systems, Inc. • 31166 Via Colinas, Westlake Village, CA 91362 Tel (818) 597-3200 • Fax (818) 597-3210
<http://www.newcominc.com>

CIRCLE 036 ON READER SERVICE CARD

From your Madison Ave. sui

*The Micron Millennium and Millennium TransPort™
in your office,*

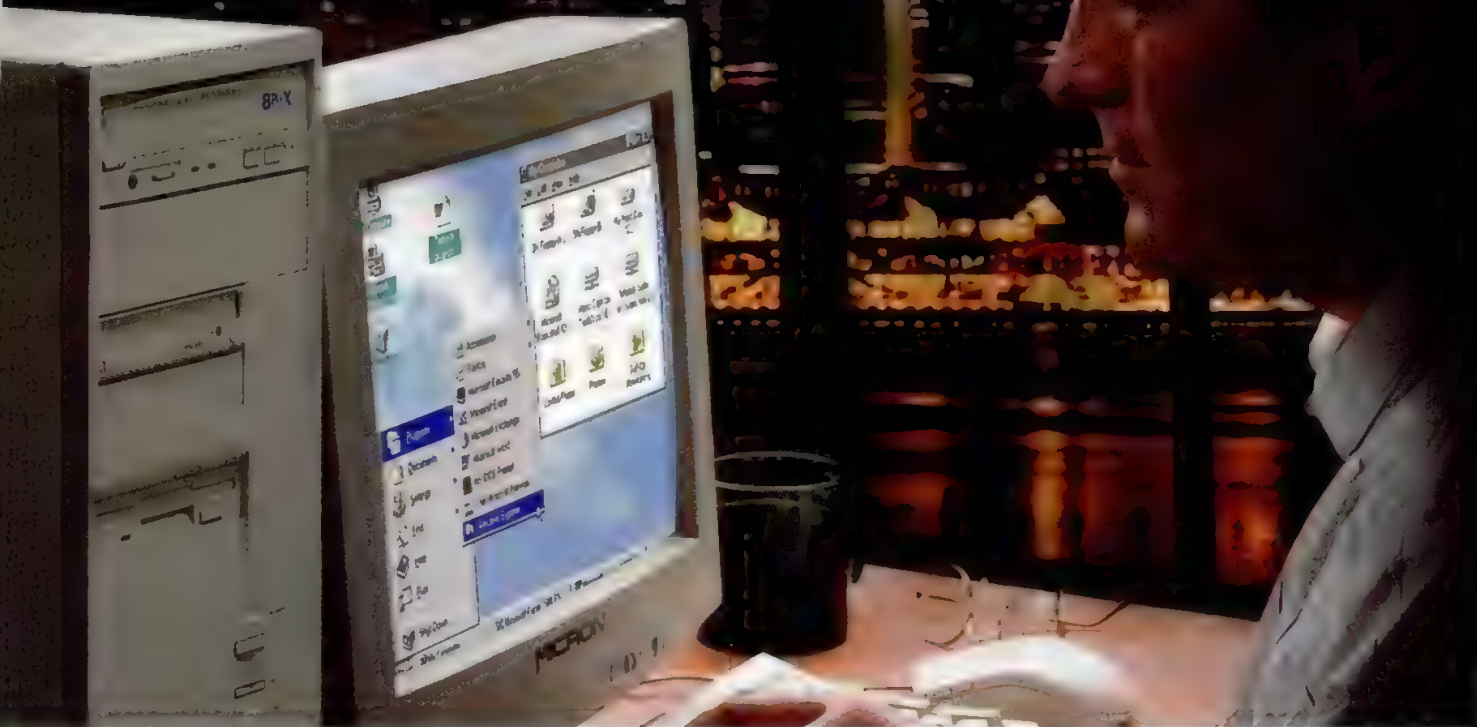
Millennia desktop PC

The Micron Millennium's stellar performance has won industry applause time after time, including a "Best Products of 1995" award from *PC Magazine*, which called it "... nothing short of the best all-around PC available on the market today." Unleashing up to 166MHz of computing power, the Millennium gives you outstanding multimedia computing, tool-free setup and the industry's best warranty.

P150

Starting at
\$2,199

For details, see ad, pg.48



May 1995
Millennia
Desktop



May 1995
Millennia
Desktop



July 1994



Millennia
TransPort

Micron has

©1995 Micron Electronics, Inc. All rights reserved. All prices and specifications subject to change without notice. Micron Electronics, Inc. is not responsible for misuses and damages caused by its products. All trademarks and registered trademarks are the property of their respective owners. Micron is a registered trademark of Micron Electronics, Inc. Windows 95 and Windows are registered trademarks of Microsoft Corporation. Micron is a registered trademark of Micron Electronics, Inc. All other trademarks are the property of their respective owners. Shipping and handling charges may apply. Price does not include return freight and original shipping handling charges, applicable to Micron brand products and best return date of shipment. All returns require RMA numbers and must be shipped in the original condition, properly packaged and insured. Us \$1995 P150/9558

te to your 747 first-class seat
*deliver all the computing power you'll ever need
or in the air.*

Millennia TransPort™ portable PC

The Micron Millennia TransPort gives you 133MHz performance and features already winning industry-wide acclaim, including accolades from *PC World*, which found it "faster than any other notebook we've tested." Get the right features and options to build a notebook PC of your dreams, that *PC Magazine* praises as "nearly a dead ringer for IBM's ThinkPad . . . but performs better and saves you about \$2,500."

P133

Starting at
\$4,699

For details, see ad. pg.152

you covered.

MICRON
ELECTRONICS, INC.

800-295-0564

<http://www.mei.micron.com>

• 900 E. Kucher Road, Nampa, ID 83687 • Mon-Fri 6am-10pm Sat 7am-5pm (MT) 208-893-3434 • Fax: 208-893-3424 • Purchase Order Fax 208-893-8992
• Technical Support Available 24 Hours A Day-7 Days A Week • Technical Support E-mail: techsupport.mic@micron.com

CIRCLE 119 ON READER SERVICE CARD

Corel® Office Professional

Beats Microsoft® Office in so many ways!

Corel® Office Professional helps you accomplish more in less time—with better-looking results. It's also a suite that makes optimum power and productivity a reality for your business. Delivering state-of-the-art office applications, sophisticated graphics tools and superior Internet connectivity, Corel® Office Professional's 16-bit power outperforms Microsoft® Office for Windows® 95 in several key areas.

Corel® WordPerfect® 6.1

- ★ Combined text justification - use flush left, center and flush right *all on the same line*
- ★ Reveal codes display - shows every formatting detail of your document—great for trouble-shooting
- ★ QuickTasks™ - automated tasks that work across multiple applications
- ★ Grammatik® - rewrites incorrect sentences with a click of the mouse. Helps you write better—faster
- ★ QuickFinder™ - finds any file from anywhere you specify in a flash
- ★ Graphics editing - control the brightness and contrast of a picture
- ★ Make It Fit™ Expert - shrinks or expands a document and you choose what formatting features are changed
- ★ QuickCorrect™ - corrects typos and expands abbreviations on the fly
- ★ Document Experts - just fill in the blanks for instant professional letters, memos, fax sheets and more or make your own
- ★ 98 spreadsheet functions - all available with a click of the mouse

Corel® Quattro® Pro 6.0

- ★ Formula Composer - revolutionizes creating, editing and viewing formulas
- ★ QuickFormat™ - apply your choice of ready-made formats to any range—for great-looking spreadsheet printouts
- ★ Analytical Experts - 19 Analytical Experts do your calculations for you
- ★ Analytical Graphs - automatically create linear fits, moving averages, aggregations and more
- ★ Coaches™ - interactive Coaches teach you all you need to know
- ★ QuickTemplates - for fast invoices, purchase orders, expense reports and more
- ★ Cell capacity - enter more than 1,000 characters per cell

Paradox® 5.0

- ★ Query multiple databases simultaneously both locally and on a network
- ★ OLE 2.0 client and server support - put a Paradox® data table right where you want it
- ★ Complex data modeling - draw multiple relationships and links between data tables with a simple click and drag
- ★ Data security - private user directories, record-level locking and table- and field-level validity checks ensure that data is solid and secure
- ★ Object-oriented design - everything in Paradox® is a visually represented computer object, making it easy to create items from data tables and reports to full database applications
- ★ Experts - quickly creates forms and reports

Corel® Presentations™ 3.0

- ★ Built-in TWAIN interface lets you scan artwork or drag video images directly into your show
- ★ Build slide shows directly from your WordPerfect, Microsoft® Word or Lotus Ami Pro® outline
- ★ Versatility - apply multiple backgrounds, graphics, sound and text within one presentation

The Bottom Line:

Corel® Office Professional for Windows® 3.1x lets you do all this more quickly and easily than Microsoft® Office Professional for Windows® 95.

WordPerfect® 6.1 beats
Microsoft® Word for
Windows® 95 for Editor's
Choice.
PC Magazine, Nov. 1995

KUR-0228

COMPUTER

The logo for City Supercenter, featuring the word "City" in a stylized script font with "SUPERCENTER" in a bold, sans-serif font below it, all enclosed within a diamond-shaped border.

Call for
direct connect
to your
nearest store.

1-800-THE-CITY
1-800-843-2489

Corel is a registered trademark of Corel Corporation in Canada, the United States and/or other countries. Microsoft and Windows are either trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries. Sidekick and Dashboard are trademarks of Starfish Software Inc. Paradox is a registered trademark of Borland International. Grammatik is a registered trademark and GroupWise and Envoy are trademarks of Novell, Inc. AT&T WorldNet is a service mark of AT&T Corp. Netscape Navigator is a trademark of Netscape Communications Corp. All other company and product names are trademarks or registered trademarks of their respective companies.

*US\$ plus applicable taxes.

†Includes client license only. Software not included.

<http://www.corel.com>

Call now for faxed literature!
1-613-728-0826 ext. 3080

The #1 Suite Solution for Today's Office



COREL Office

\$499⁹⁹

Full CD-ROM version

\$259⁹⁹

Competitive upgrade CD-ROM version

Plus:

Business Graphics

- CorelFLOW™ 2
- 1,000 fonts
- 10,000 clipart images

Desktop Utilities

- Sidekick™ 2.0
- Dashboard™ 3.0
- Corel® Screen Saver

Network and Internet Connectivity

- AT&T WorldNet™ Service software including Netscape Navigator™ Internet browser
- GroupWise™ 4.1 client license†
- Envoy™ 1.0
- InfoCentral™ 1.1

Corel® Office Professional includes:

- **Corel® WordPerfect® 6.1**, the world's best word processor, helps you do more things faster and easier than Microsoft® Word. In fact, with text-editing enhancements and intelligent automation tools second to none, Corel® WordPerfect® actually does much of your work for you—allowing you to concentrate on creating great documents, not on your software.
- **Corel® Quattro® Pro 6.0**, the most versatile spreadsheet at any price, delivers the functions found in Microsoft® Excel and Lotus 1-2-3®. With QuickFormat™, you can apply your choice of ready-made formats to any range and get great-looking spreadsheet printouts. It's *The Perfect Way™* to make your numbers count.
- **Paradox® 5.0**, the industry-leading relational database. With data-handling power for many enterprise-wide tasks, building database applications and managing large amounts of business information is faster and easier than ever before. It's *The Perfect Way™* to manage your data.
- **Corel® Presentations™ 3.0**, the powerful presentations graphics package, is easier to use than Microsoft® PowerPoint. You get all the tools you need to create stunning presentations quickly and effectively. It's *The Perfect Way™* to sell your ideas.

Attention All CCLP Customers and Migrating Novell VLA, MLA, CLA and CAP Clients

Corel® has implemented two new licensing programs. Designed to cater to the needs of all our customers, including current CCLP clients and migrating Novell VLA, MLA, CLA and CAP clients, Corel® Licensing Program Choice (CLP Choice) and Corel® Licensing Program Universal (CLP Universal) offer hassle-free purchasing, market-leading business and graphics applications and a partnership with a world-class vendor that understands your business' individual needs.

CLP Choice

- The most versatile software acquisition program available
- Ideal for businesses with small volume purchasing requirements
- No minimum purchase required
- Unlimited end-user technical support on a toll line

CLP Universal

- Competitive pricing based on volume purchasing with a cumulative discount option
- Fits the needs of all major account clients, including migrating Novell MLA, CLA, and CAP clients
- \$50,000 US gross initial purchase

Offering competitive pricing and flexible software solutions tailored to your needs, CLP Choice and CLP Universal have so much more to offer than standard licensing programs. Why not check out the details with your favorite reseller today and give your business a leading edge.

¶

Our TextBridge Pro scanning software even reads the characters you don't see.

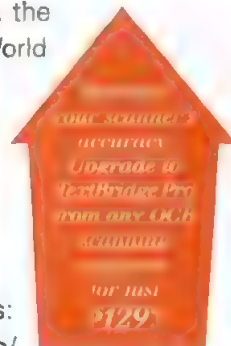
X If you've ever scanned text, you know. Getting tabs, margins and paragraph breaks right is just as important as getting words right. Because without format, you might as well retype the whole thing.

Scanning pages with TextBridge® Pro 96 OCR software is just like putting the original document straight into your PC. Headers, columns, cell tables, text and all. You get a formatted document you can work with right away.

TextBridge Pro scans text directly into any word processing program with

superior accuracy. It's also designed for Windows 95, and runs on NT and 3.1. TextBridge Pro includes SoftQuad's HoTMetaL light 2.0, the HTML word processor for the World Wide Web. And with the Xerox Guarantee that includes unlimited toll-free support*, plus a thirty-day, risk-free offer, you can't go wrong.

To learn more, call us: **1-800-248-6550, ext. 3**, visit us: www.xerox.com/products/tbpro/ or see us on CompuServe at Go TextBridge. We'll show you how to get a more accurate scanner without buying a new one. With the scanning software that can read almost anything. Even if it's invisible.



THE DOCUMENT COMPANY
XEROX

In Canada call 1-800-ASK-XEROX.

*For registered users *Manufacturer's suggested retail price Actual price may vary ©1996 Xerox Corporation Xerox® The Document Company®, the stylized X, and TextBridge® are trademarks of Xerox Corporation



CIRCLE 163 ON READER SERVICE CARD

Online Service or the Internet?

To some people, the headline on this issue's cover may seem a bit contradictory. "Online Services in an Internet World"? Why both? But to those of us who spend much of our time looking at all the new and wonderful things happening on the Net,

such a question is not out of place. After all, a lot of us find more information on the Net than we do on America Online, CompuServe, or the Microsoft Network.

But as much as I recognize the appeal of the Internet, particularly its potential to encompass all sorts of information, I wonder if that model really makes sense for everyone. By most estimates, only about one in nine U.S. families is online. While that number continues to grow, we know that getting onto the Internet, especially at home, still isn't easy. Have you tried walking your parents through the steps involved: contracting with a service, obtaining the proper software, setting up a modem, and figuring out where to go on the Net?

The online services' one-stop-shopping approach to access, software, and content still has great appeal. That's why AOL and MSN continue to pick up new members at an amazing pace. I do expect these services to become more and more Internet-based, but this doesn't change the fact that the online world looks and feels very different to an AOL subscriber than to someone who uses an Internet service provider or a direct connection.

The online services continue to grow, but at the same time, the Internet itself is changing. We're seeing a lot of new kinds of content including more sites with audio, video, and animation. Check out our own site (<http://www.pcmag.com>) for some great examples.

Another change likely to have an impact on the shape of the Internet is that a number of the more popular sites are now considering doing something heretical—charging money. You mean the Internet won't be free anymore? That's exactly what I mean—at least, not all sites. Already, some big sites are charging for data or have announced plans to do so, including the *San Jose Mercury News'* Mercury Center, Time Warner's Pathfinder, and *The Wall Street Journal*. You'll still be able to get a lot of material for free, but much of the best stuff will come at a price.

For these reasons, I believe we may well end up with three distinct classes of service:

At the basic level, there will be the Internet, pretty much



NATURAL SELECTION

Online services will survive, not because of their content, but because they are easy to use.

as we're used to it. You'll typically have to order the service, get the software, and then access the service manually. At home, it may well exist only at modem speed. The content is likely to be similar to what we have now—mostly "free" information, some supported by government and institutions, some in the form of marketing, and the remainder sponsored by advertising.

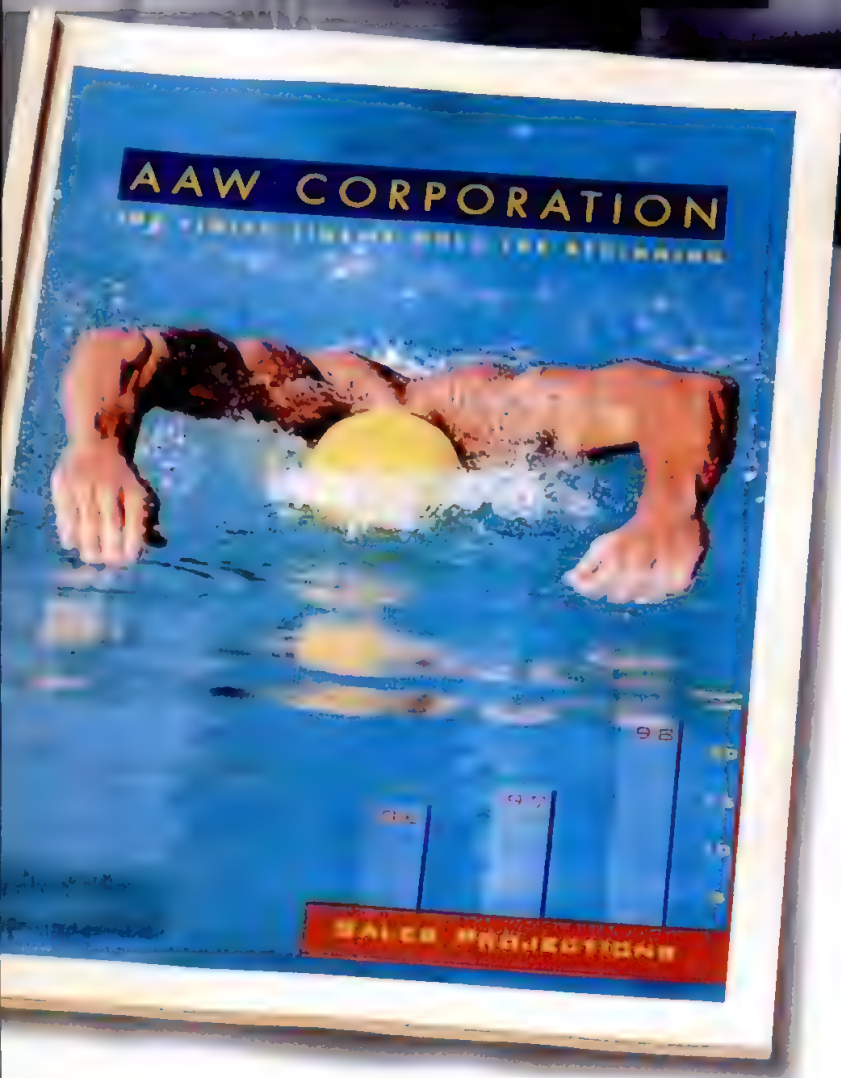
At a more sophisticated level, you'll be able to get lots of expensive content such as customized newspapers and magazines, up-to-the-minute financial information, and specialized forms of entertainment. Along with this, we'll have interactive movies, video conferencing, and all sorts of multimedia experiences. All of this will require more bandwidth (see "Fast Connections" in this issue for the latest on ISDN, ADSL, cable, and satellite technologies). In addition to raw speed, you'll probably want guaranteed delivery. For all this, you'll probably be charged a hefty fee. And while these personalized services will have great appeal, they may also be complicated.

Both these levels of service will have their place, but my guess is that a large market will remain somewhere in be-

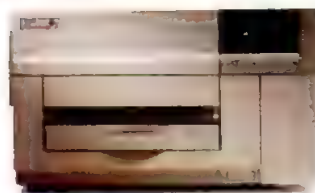
tween, and that's where online services fit in. Online services will bundle together online access, many kinds of content, an easy way of organizing that information, and the ability to order more information on an à la carte basis. It probably won't be flashy or use the latest technology, but it will be reliable, and it will give you Internet access. That's all many people will want and need. In this scenario, the online services survive and could even thrive, not because they have so much content, but because they are so easy to use.

In a way, it's just like television. You can put an antenna on your roof and receive broadcast TV at little cost. Or you can choose a premium cable package or direct satellite connection and get all the bells and whistles. Or you can do what most people do: Get a basic cable package with most of what you'll need and, if you want, purchase some extras later. Personally, I want the premium service, and I'd guess I won't be alone. But when I look at the costs, I wonder whether many may well opt for something in the middle. □

In the past, winning new business
was a black or white proposition.



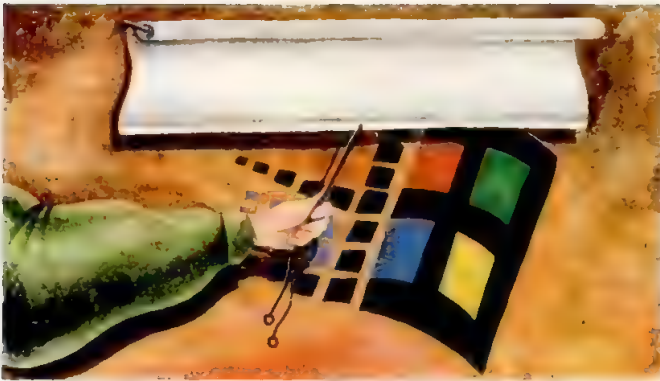
Introducing the future.
The HP Color LaserJet 5.



First impressions are important, but business is often won or lost based on last impressions. So why shouldn't your proposals be as impactful and persuasive as possible? With the new HP Color LaserJet 5 printer, they can. Dramatic improvements in technology allow the Color LaserJet 5 to create 1200 dpi equivalent image quality, literally producing millions of permanent solid colors. The Color LaserJet 5 is compatible with all popular software and is fully networkable. Best of all, with its remarkably low cost of ownership, you'll be amazed at how little it costs to add color to your documents. Call 1-800-LASERJET Ext. 1443 for some thoroughly convincing print samples. So you can start claiming business victories today.

Trends

TRENDS & TECHNOLOGIES SHAPING THE PERSONAL COMPUTER MARKET



Mainstream NT

A competitor for Windows 95?

Although Microsoft has assured Windows 95's status as a pop-culture phenomenon, sales of the operating system may never reach those of its predecessor, Windows 3.1 (100 million copies worldwide). Microsoft has already sold over 20 million copies of Windows 95, but the company's higher-end operating system, Windows NT, is poised to usurp many of the business desktops that have yet to upgrade from 16-bit computing. Upcoming changes to this 32-bit operating system—together with other industry announcements—could push Windows NT into the mainstream market by the middle of 1997.

With the release of Intel's new Pentium Pro processor—which is optimized for 32-bit code—Windows NT received a significant shot of adrenaline. According to Microsoft CEO Bill Gates, sales have doubled over the past year. Once Intel scales down the Pentium Pro and makes it more affordable, Windows NT will have an even faster path onto

the mainstream desktop. "The Pentium Pro definitely gives IS managers greater NT performance," says Adam Taylor, group product manager for Windows NT at Microsoft. "Naturally, as the cost of hardware comes down, NT's system requirements will become more affordable and NT will become more appealing."

Of course, an operating system's appeal rests primarily in its design. Windows NT's current incarnation, Version 3.51, still uses the Windows 3.x user interface, offers few native applications, and won't run real-mode device drivers. It does, however, provide robustness and stability: Since operating system services are run in address spaces separate from Win32 applications, and since 16-bit programs are run in a special, protected address space, Windows NT isn't subject to recurring crashes.

With the imminent release of Version 4.0, however, several of Windows NT's shortcomings will become history. The prerelease version is already equipped with the Windows 95 user interface, and it will soon be backed by the new Win32 Driver Model (WDM), which offers compatible drivers across all Windows platforms. These enhancements, plus the fact that most new Windows 95 applications are also Windows NT-certified, should make Version

4.0's final code—scheduled for release around midyear—an attractive option for the desktop.

But don't expect Windows NT to be ubiquitous overnight. Windows 95 will continue to be a force in the PC market during the coming year, especially in the home and portable markets. After all, Windows NT still lacks such user-friendly features as Advanced Power Management, Plug and Play, hot docking, and extensive PC Card support.

Windows NT will also have to contend with IBM's 32-bit challenger, OS/2 Warp. Scheduled for beta testing this spring and release by the end of the year, OS/2 Warp's next incarnation—code-named Merlin—not only adds enhancements to its interface and Web browser, but also includes several compelling voice recognition features. OS/2 Warp has yet to garner widespread support from developers, but IBM claims to have already shipped over six million copies, with major customers in banking, insurance, and manufacturing. —Cade Metz

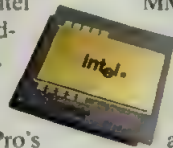
Penny-Pinching Pentium Pros

Naturally, a mainstream operating system requires mainstream hardware. Current versions of the Pentium Pro—the foundation of most of the new Windows NT systems—are much too expensive as mainstream chips, but Intel plans to offer a more affordable, scaled-down incarnation by the beginning of 1997.

Dubbed the Klamath (after the moody river that runs through Oregon and California), this chip will forgo the Pentium Pro's on-board L2 cache in favor of reduced costs. PC manufacturers will need to supply their own external caches, an unfortunate circumstance: If the L2 cache is not on the chip, it must run at the speed of the bus, which, at 66 MHz, is considerably lower

than the 200 MHz of current Pentium Pros. But to make up for the drop in performance, Intel plans to increase the primary cache to about 32K.

The Klamath will also support Intel's new MMX extensions, which greatly improve multimedia handling and may boost 16-bit performance by including the Pentium's segment descriptor cache. The chip will be manufactured via a 0.28-micron process and will run at speeds approaching 266 MHz. The subsequent Deschutes chip (planned as a scaled-down version of the Klamath and also named for an Oregon river) will be manufactured via a 0.25-micron process, and will reach speeds of 300 to 333 MHz. —CM

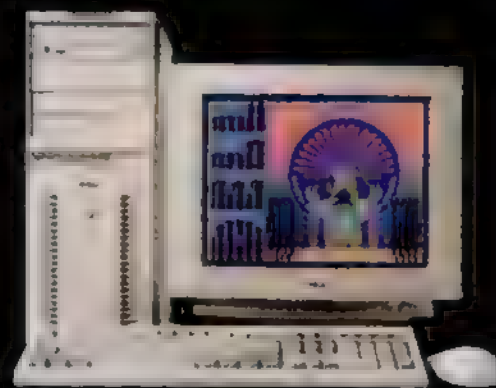


A BETTER 3 YEAR SERVICE YOU HAVE OUR WORD

NEXT-BUSINESS-DAY AT-YOUR-DESK SERVICE GUARANTEE*

If your Dell system experiences a covered hardware failure while it is under a next-business-day, on-site service contract purchased from Dell, and if Dell has dispatched a service call before 5:00 PM local customer time, Monday through Friday, a technician, if needed, will arrive at your location to address your problem by the end of the next business day. In the rare event that the technician does not arrive as promised, let Dell know. Your situation will receive top priority for resolution, plus you will receive an additional month of service for free.

PROGRAM? ON IT.



DELL DIMENSION™ XPS Pro150n

150MHz PENTIUM® PRO PROCESSOR

- Mini Tower Model
- 16MB EDO Memory
- 256KB Internal L2 Cache
- 2.5GB Hard Drive [10.5ms]
- 17LS Monitor (15.7" v.i.s.)
- 9FX Motion Graphics Accelerator with 2MB VRAM
- 8X Multi-session EIDE CD-ROM Drive
- MS® Office Professional with Bookshelf for Windows® 95
- Microsoft® Windows 95/30 Days Free Support/MS Mouse
- 3 Year Limited Warranty*
- ★ Upgrade to the Imagine 128-bit Graphics Accelerator with 4MB VRAM for only \$330 more

\$2899

Business Lease[†]: \$107/Mo.
Order Code #500259

DELL DIMENSION XPS P133c

133MHz PENTIUM PROCESSOR

- Mini Tower Model
- 16MB EDO Memory
- 256KB Pipeline Burst Cache
- 1.6GB Hard Drive [10ms]
- 15LS Monitor (13.7" v.i.s.)
- 9FX Motion Graphics Accelerator with 2MB VRAM
- 6X Multi-session EIDE CD-ROM Drive
- MS Office Professional with Bookshelf for Windows 95
- Microsoft Windows 95/30 Days Free Support/MS Mouse
- 3 Year Limited Warranty
- ★ Upgrade to 32MB of EDO memory for only \$399 more

\$2199

Business Lease: \$81/Mo.
Order Code #500252

NEW DELL DIMENSION XPS P166s

166MHz PENTIUM PROCESSOR

- Mini Tower Model
- 16MB SDRAM Memory
- 256KB Pipeline Burst Cache
- 1.6GB Hard Drive [10ms]
- 15LS Monitor (13.7" v.i.s.)
- 9FX Motion Graphics Accelerator with 2MB VRAM
- 8X Multi-session EIDE CD-ROM Drive
- MS Office Professional with Bookshelf for Windows 95
- Integrated Sound Blaster 16 Sound
- Altec Lansing ACS-5 Speakers
- Microsoft Windows 95/30 Days Free Support/MS Mouse
- 3 Year Limited Warranty
- ★ Upgrade to the Dell 17LS (15.7" v.i.s.) monitor for only \$270 more

PICTURED SYSTEM

\$2549

Business Lease: \$94/Mo.
Order Code #500254

DELL DIMENSION P100i

100MHz PENTIUM PROCESSOR

- Mini Tower Model
- 8MB EDO Memory
- 850MB Hard Drive [12ms]
- 14XE Monitor (13.19" v.i.s.)
- 64-bit PCI 1MB DRAM Video
- 4X Multi-session EIDE CD-ROM Drive
- Microsoft Windows 95/30 Days Free Support/Dell Mouse
- 3 Year Limited Warranty
- ★ Upgrade to 16MB of EDO memory for only \$139 more
- ★ Upgrade to a 1.6GB hard drive for only \$100 more
- ★ Add a 3Com EtherLink III Network Interface Combo Card with Parallel Tasking for only \$99 more

\$1449

Business Lease: \$54/Mo.
Order Code #500250

If you are looking for a better service program, we have one word for you: guaranteed. At Dell, we guarantee that if there's a problem with your Dell Dimension, a Dell-certified technician will be at your desk the next business day, servicing your PC. And in the rarest of events that we're not there the next day, you get an extra month of service at no charge.

It's all part of our new and improved standard service program that covers your Dell Dimension PC for 3 full years.

Including one year of Guaranteed

Next-Business-Day, On-

Site service[†] the first year, and then two additional years of Next-Business-Day Parts Delivery.

So call today and get covered by the Dell Service program.



DELL

TO ORDER, CALL

800-626-8301

In Canada,* call 800-839-0148

Mon-Fri 7am-9pm CT • Sat 10am-6pm CT

Sun 12pm-5pm CT • <http://www.dell.com/>

Keycode #04258

Dell's featured computer artist is Daniel Fenelon.

*Guarantees available in the U.S. only for registered owners of Dell Dimension systems purchased after 8/1/93. †For a complete copy of our Guarantees or Limited Warranties, please write Dell USA L.P., 2214 W. Braker Lane, Suite D, Austin, TX 78758. ‡On-site service provided by BancTec Service Corp. On-site service may not be available in certain remote locations. §Business leasing arranged by Leasing Group, Inc. *Prices and specifications valid in the U.S. only and subject to change without notice. The Intel Inside logo and Pentium are registered trademarks of Intel Corporation. MS, Microsoft, Windows and the Windows logo are registered trademarks of Microsoft Corporation. ©1996 Dell Computer Corporation. All rights reserved.



Designed for
Microsoft®
Windows®95

The Big Battle over Tiny Storage Cards

SanDisk and Intel face off for the minicard market.

The market for matchbox-size memory cards is about to heat up. Several computer and consumer electronics devices with built-in support for CompactFlash, SanDisk's smallest form-factor storage cards, have already appeared. But a competing technology, called the Miniature Card, was announced in January, with Intel among its supporters.

Both camps emphasize that "design wins"—inclusion of the cards in shipping products—are the key to victory in the struggle between CompactFlash and the Miniature Card. The stakes are high in this contest, because the Lilliputian storage devices will be used not only in portable computing applications but also in the far broader market of consumer electronics products like digital cameras and audio recorders.

Initially, Miniature Cards will have capacities of 2MB and 4MB; the specification calls for an upper limit of 64MB. CompactFlash cards are currently shipping in capacities of up to 15MB, and a SanDisk spokesperson says that 30MB cards will be available in the first half of 1997, with 100MB cards to appear in 1998.

SanDisk's CompactFlash cards have on-board ATA adapters that allow them to act as disk drives,

while the Miniature Cards require flash translation software for that capability. That won't make much difference to consumers, says Connie Batchelder, senior analyst with In-Stat, an Arizona-based market-research firm. "There has always been a division in the flash-card market," she explains. "Some flash-card manufacturers have adopted one or the other, and some have used both. Consumers



are not going to understand the distinction. They just want to buy a camera, take it home, and take pictures.

Whichever technology gets the most design wins and offers the smoothest compatibility between platforms will come out on top."

CompactFlash has taken the early lead in announced products. Easily the most glamorous design win so far has been IBM's minuscule PC Palm Top



110—available only in Japan—which has a built-in CompactFlash slot. Canon has decided to market CompactFlash as an option for its new PowerShot 600 digital camera. A 4MB card will store up to 72 images.

Although no details are available yet on which specific products will use the Miniature Card, digital cameras should appear by the fall, followed by audio recorders early in the fourth quarter. Personal digital assistants that use the Miniature Card should ship in 1997, and wireless communications products such as smart phones and two-way pagers should arrive in 1998.—Jonathan Matzkin

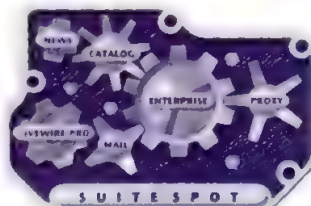
Netscape Boosts Intranet Suite

SuiteSpot to challenge Exchange and Notes.

With the announcement of three additions to its SuiteSpot family, Netscape Communications could make its standards-based server software competitive with Lotus Notes and Microsoft Exchange.

The new server products—scheduled to ship in the third quarter—deliver important security and management features missing from Internet-based tools. Netscape is also integrating the group-discussion functionality of Collabra Share—bought by Netscape last year—into the next versions of its browser and server products.

Netscape Directory Server will provide a global directory service based on the Lightweight Directory Access Protocol (LDAP) for a single point of network manage-



ment. Netscape Mail Server 2.0 will let you manage messages offline and remotely synchronize mailboxes with the server. Netscape Certificate Server will provide X.509-based digital authentication certificates for secure e-mail and other Internet and intranet transactions.

Following the company's strategy, each of the new servers will be based on open Internet standards. Netscape hopes this will win users and developers away from Lotus Notes and Microsoft Exchange, which rely on vendor-specific application programming interfaces. The products will be available for Windows NT Server and for all of the Unix platforms currently supported by the other SuiteSpot servers. And because its software is based on Internet technology,

Netscape says SuiteSpot products will be much more scalable than Notes or Exchange and cost less.

The Directory Server is based on LDAP (Internet RFC 1777), a subset of the X.500 ITU directory standard. Like the other SuiteSpot servers, the Directory Server lets administrators manage the server via a frames-enabled browser. LDAP provides a standard way for users, servers, and applications to access and replicate directory information. Other vendors—including AT&T, Banyan Systems, Novell, and Sun Microsystems—are also supporting LDAP.

Netscape says it will add LDAP to all of its servers and to the fall release of Netscape Navigator (code-named Dogbert). Netscape also announced that it has hired the University of Michigan researchers who developed and deployed LDAP.

The new Mail Server is based on RFC 1730 and the Internet Mail Access Protocol (IMAP), Version 4.0, which defines remote-access features such as partial-message download and off-line mail storage.

The Certificate Server uses the authentication functionality of SSL (Secure Sockets Layer) and will integrate with the Netscape Directory Server—or, in theory, with any LDAP-based directory server—to manage certificate distribution.—Todd Spangler

Top Retail Software

- 1 Microsoft Windows 95 Upgrade Microsoft
- 2 First Aid Cybermedia
- 3 Microsoft Plus! for Windows 95 Microsoft
- 4 Netscape Navigator Netscape Communications
- 5 Norton Antivirus Symantec
- 6 VirusScan McAfee
- 7 Uninstaller MicroHelp
- 8 Remove-It 95 Vertisoft
- 9 CleanSweep 95 Quarterdeck
- 10 QEMM Quarterdeck

*Source: PC Data Data for March, 1996



CHOOSING THE RIGHT MEMORY IS
LIKE CHOOSING THE RIGHT GLASSES.
NOT JUST ANY KIND WILL DO.



People who say all memory is the same aren't seeing things as clearly as they should be. The reality is that memory isn't just memory. It can differ widely from manufacturer to

manufacturer. And even a subtle difference can make all the difference to your computer. At Kingston® we manufacture 1,900 different kinds of memory for almost every PC, server, workstation, and printer out there. Our engineers customize each design for a particular system. So compatibility is guaranteed. We use exactly the same memory components and

specifications the system manufacturers use. And we test every cell on every chip on every module. (On a 16 megabyte module, that's 128 million cells.)

Maybe that's why the Fortune 500® — and the world's leading computer companies — choose Kingston memory more than any other brand. Despite its extraordinary quality, Kingston memory costs up to 50% less than

the system manufacturer's brand. Want to see how much you can save? Call (800) 337-3807. That should put things into focus for you.

Kingston
TECHNOLOGY CORPORATION

For more information call us at (800) 337-3807



Visit our Web site: <http://www.kingston.com/pcm.htm>

Kingston Technology Corporation, 17600 Newhope Street, Fountain Valley, CA 92708 USA, (714) 435-2600, Fax (714) 435-2699. © 1996 Kingston Technology Corporation. All rights reserved. Kingston is a registered trademark and Computing Without Limits is a trademark of Kingston Technology Corporation. All other registered trademarks are the property of their respective owners.

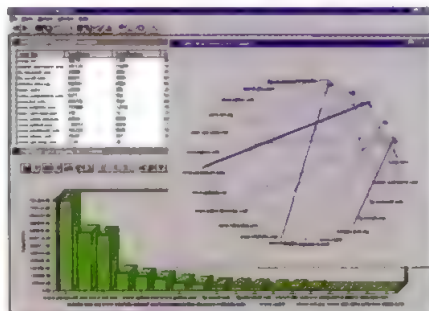
Is Your Company Watching Your Web Usage?

New products let network managers see all.

It used to be that companies with direct network connections to the Internet were worried about one thing: making sure the bad guys couldn't steal or corrupt their data. Now, a new breed of products turns the focus inward by allowing network managers to monitor how employees spend company time and bandwidth and to limit Internet access from the corporate LAN.

This may smack of pernicious, Big Brother-like control, but companies have long used management tools to control what employees can and cannot do from the corporate desktop. Furthermore, for network managers, bandwidth allocation becomes a crucial issue when managers need to provide consistent Internet access for the whole company. If Bob downloads a new copy of Netscape Navigator every hour, or if Susan's running PointCast on her desktop, they slow down service for everyone.

While traditional network-traffic analysis tools analyze the transport layer, the new programs break down the application layer. Network



TRAFFIC PATTERNS: Optimal Internet Monitor gathers and models data on network Web access.

General has announced a new version of Sniffer Network Analyzer, slated to ship this summer. This offering will track the percentage of the network consumed by Web requests and identify bandwidth abusers.

Optimal Networks' Optimal Internet Monitor—to ship in July—will parse major Internet protocols (including HTTP, NNTP, and FTP), identify the heaviest users and which Internet sites they're accessing, and send alerts when a preset threshold is exceeded (for example, when a user has downloaded more than 10MB of data in a single day).

Frontier Software's NETscout Manager gathers information through probes that sit on a network segment and provide industrial-strength monitoring of network traffic, including percentage of network usage by Internet applications.

Finally, Sequel Technology is developing Sequel Net Access Manager, first available for Windows NT Server. Designed to run on a dedicated server, Sequel Net Access Manager is the most heavy-handed of this group. It will allow you not only to monitor HTTP, FTP, NNTP, e-mail, and Telnet traffic by user or

group, but, because it actually filters every IP packet going out of your network, it will also allow you to restrict specific services or sites. It will even let you limit what types of files can be accessed. So, you actually can stop Peter from going to the *Penthouse* Web site, or prevent Bob from downloading the latest version of Netscape.—Todd Spangler

All-Ears PCs

Voice recognition software finds use in remote access.

Voice recognition was one of the themes at Microsoft's recent developers' conference, where Microsoft CEO Bill Gates predicted that, in 10 years, "95 percent of Web ac-

cess will be voice driven." AT&T Labs' Doug Sharp agrees that many of the upcoming applications will focus on Web functionality. "We expect to see Web pages that are voice recognition smart soon," Sharp says, "with possible intranet applications such as talking to a Web page over the phone and receiving a fax gener-

ated at the Web site."

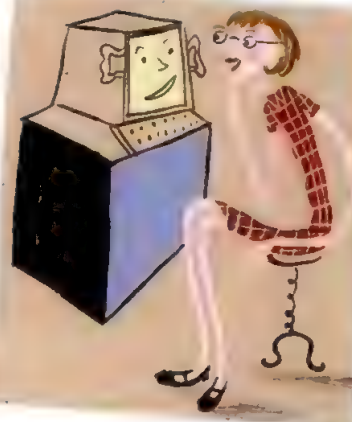
AT&T Labs' new voice recognition software, Watson ASAP, is gaining licensing attention from companies who want to use it for both PC and consumer electronics applications. The software is based on Fully Continuous Hidden Markov models, models for units of speech embedded in the software. AT&T claims the recognition is 95 percent accurate.

According to Sharp, remote users can phone in to a PC and issue various commands, such as, "Give me any e-mail messages from Bob Ford and store all other messages," after which the software will read the specified messages over the phone.

According to Larry Rabiner, director of speech and image processing services research at AT&T Labs, Watson ASAP is based on 30 years of speech research at AT&T and is the first speech processing system to be compliant with Microsoft's Speech Application Programming Interface (SAPI).

Players in the voice recognition field tend to adopt rosy views of how useful the technol-

ogy currently is. AT&T Labs' Rabiner says recognition technology "can transform a PC into a personal assistant or a corpo-



rate receptionist." Although the technology may not quite be there yet, AT&T's Watson ASAP has already been licensed by 50 companies.

In what may prove to be another far-reaching step forward in speech recognition, IBM's Voice-Type technology will be built into the next version of OS/2—code-named Merlin. Merlin will let you issue spoken instructions for opening applications, resizing windows, and accessing menu items.—Sebastian Rupley

PC Magazine Online Events



WWW.PCMAG.COM. Looking for a utility? Wondering where on the Web you can go to get some shareware? Just visit PC Magazine Online's **Download** site and instantly access all of *PC Magazine's* utilities and the entire ZD Net Shareware Library—plus get copies of PC Magazine Labs' latest benchmark tests. And if you come to the site right now, you'll find the winners of the 1996 Ziff-Davis Shareware Awards.

PC MAGNET. From this online service of ZD Net available through CompuServe (GO PCMAGNET), you can download *PC Magazine* utilities (GO TIPS) and join in freewheeling discussions about new products in *PC Magazine's* Editorial forum (GO EDITOR). **First Looks Plus:** From May 27 to 31, discuss Microsoft Exchange with contributing editor Tony Pompili and a Microsoft Exchange representative. From June 10 to 14, join PC Labs project leader Jay Munro and a Symantec representative for a discussion of Symantec Café.—Tin Albano

By Jake Kirchner

A Passion for Personal Computing, Mac-Style

Macintosh users are passionate about their computers. I have experienced that passion firsthand—not because I have been a Mac user, although I have, and not because dozens of my friends and coworkers are Mac users, although they are. I have experienced that passion firsthand through the thousand or so letters I received after I wrote here of my doubts that Apple Computer would ever recover fully from its current financial problems.

In that column, published in our issue of April 9, 1996, I expressed the opinion that when a company experiences severe and mounting losses and decides to concentrate on selling to its installed base—no matter how large or loyal—it's heading for ruin. I said our industry would miss the competition a strong Apple has provided, but I also said I couldn't feel sorry for a corporation that has frittered away so much talent and money on smug advertising campaigns and bungled marketing strategies.

I repeat the gist of that column not to reopen wounds or to risk another flow of outraged letters, but simply to explain the emotion—in some cases, the fury—I unleashed.

Many of the letters thoughtfully discussed the strengths and benefits of Apple's technology. The writers provided fond, touching accounts of their affinity for Macs and of the productivity and personal development their computing experiences have afforded. As one who has a long-standing attachment to personal computing and who makes a living through it, I enjoyed those letters very much.

Many argued that other companies—Mercedes-Benz was a favorite comparison—have lost much more money than Apple yet have continued to prosper. I can't say I found those analogies all



My column on Apple Computer unleashed a flood of emotion—and plenty of fury.

that persuasive. And I was surprised that only a few writers suggested that Apple is singularly well positioned to prosper in an age of Internet computing. I used to believe that that was the company's golden future as well, but I haven't seen much success in Apple's efforts to exploit the opportunity.

Unfortunately, those thoughtful and lyrical letters were a minority. By far, most of the letters were single-minded diatribes against "Windoze," which many writers described as a piece-of-junk "Mac-wannabe" foisted on us by that devil incarnate, Bill Gates.

Finally, about 5 percent of my correspondents sent letters so obscene and scatological, I can't even paraphrase them. About those writers, I will say only that these self-styled "evangelists" must be reading from a Bible far different from mine. More importantly, I recognize that they are not typical of Mac users.

As challenged by many writers, I'll revisit this topic when Apple's fate is clear. And if my predictions prove wrong, I'll happily read the thousand "I told you so" letters that will surely follow.

In the meantime, I leave you with a thought about passion: Many writers spoke of devotion to the Mac, this "insanely great machine." I think passion is admirable. What would life be without it? But keep in mind that the Mac is only a machine. In your hands, it may be a tool, a pen, a paintbrush, a camera, or a musical instrument—and so it may be in mine. But it's what you do with your Mac that's important, not the machine itself, no matter how elegant its design. We're all better off if you save that passion for your art, your family, your community, the environment, or world peace. Don't waste it on a corporation, and don't waste it on a machine.

Webtop Apps

Where does the applet end and the application begin?

As the first sophisticated applications based on Java take shape on the Web, developers are learning some far-reaching lessons. Are we really headed for an onslaught of Web-based Java applications that might present a broad-based threat to standalone applications? Thoughts are divided. Early Java developers, for example, characterize Java as a young development language that works much better for some kinds of applications than for others.

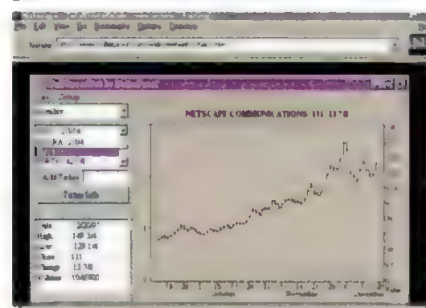
"Java is certainly not ready to do full-blown productivity applications, and there are some kinds of

applications that will work better than others," says Scott Milener of BulletProof Corp., maker of the sophisticated Java-based investment application, WallStreetWeb. "It makes sense to do a word processor or a spreadsheet as a standalone application, written in C++ and distributed at retail," he continues. "I like being able to save to my local disk and to print with my word processor, among other things—both of which Java won't facilitate." Milener adds that Java is not yet secure, and that the language needs to be much faster.

Sun's Eric Schmidt agrees. He applauds efforts like Borland's to develop just-in-time compilers for Java, and he adds that Sun's upcoming chips designed to accelerate Java applications will help, too.

BulletProof's WallStreetWeb is

designed to compete with standalone market-charting applications like Metastock and Windows on Wall Street. BulletProof gets its revenues from WallStreet-



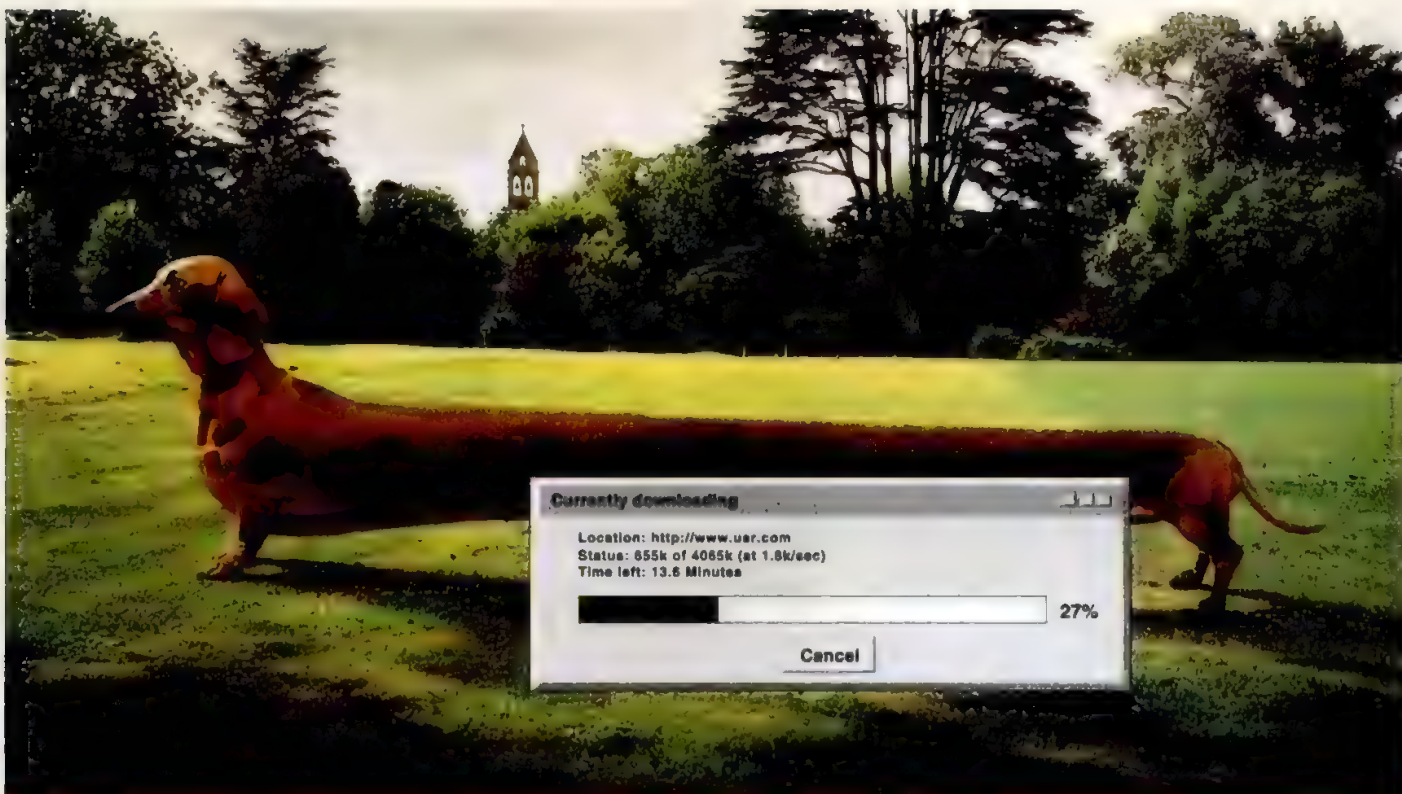
DATA DELIVERY: BulletProof's WallStreetWeb charts current securities data via the Web.

Web by charging \$9.95 per month for the delivery of securities data via the Web. Data delivery is the area that makes for what Milener

calls "the killer Java app."

The race is definitely on to create mainstream productivity applications on the Web, and proponents of the concept of "network computing," like Oracle's Larry Ellison, say it won't be long before standalone productivity applications do face real Web-based threats.

Proponents of network computing say the trend toward Web-based applications does not end where word processors and spreadsheets begin. Says Ellison, "Applications of all kinds are headed for a central network where they can be upgraded automatically and delivered seamlessly."—*Sebastian Rupley*



So much to download, so little time.

Click on the Net, grab some coffee, go to a bookmark, play with your dog, click on the news, take a bathroom break, download a JPEG, go to lunch... Sound familiar?

**If you use Windows,[®] nothing is
faster than a Winmodem.[™]**

Let's face it. Waiting for stuff to download is no fun. But for a surprisingly affordable amount, you can get what you want faster.



The new Sportster[®] 28.8 Kbps Winmodem is the first modem designed for the Windows operating system on your PC.* Simply put, it uses the existing power of Windows to transfer and download files faster than ever before. And unlike other modems, Winmodem gives

you the proven compatibility and reliability of Sportster, the #1 selling modem in the world. It's easy to install, it's Microsoft Plug and Play certified, and one simple call to the U.S. Robotics BBS is all it takes to upgrade for free to 33.6. And our exclusive *Connections*

CD-ROM ~ inside the Winmodem box ~ gives you a wide selection of special online offers and software for the family. To learn more about the Sportster Winmodem, call

1 800 DIAL USR. In fact, you could do it now...while you're waiting for your current modem to download.

U.S. Robotics[®]
The Intelligent Choice in Information Access

<http://www.usr.com>

sales@usr.com

support@usr.com

*Sportster Winmodem requires use of the Windows operating system. U.S. Robotics, the U.S. Robotics logo and Sportster are registered trademarks and Winmodem is a trademark of U.S. Robotics. All other product names are used for identification purposes only and may be trademarks and/or registered trademarks of their respective companies. Product specifications subject to change without notice. Contact your U.S. Robotics representative for current product information.

First Looks

HANDS-ON REVIEWS OF NEW SHIPPING PRODUCTS

PCs

Gateway Destination: The PC for The Office and the Family Room

By Bruce Brown

In an impressive leap in personal-computer design, component-bundling, and marketing, the Gateway Destination, a big-screen PC/TV, is ready to bring computing, online access, and television to a couch near you. PCs with large monitors and TV tuners are nothing new, but the Destination is the first to put everything together in an attractive package that includes a wide variety of family oriented software. Priced from \$3,599 (Pentium/120) to about \$5,000 (Pentium/166), the Destination's only shortcoming is the use of a low-resolution monitor that is capable of a maximum resolution of only 800-by-600.

On the surface, the Destination D5-166 test system we looked at was thoroughly conventional. The system lists for \$4,349, including a Pentium/166 processor, an Intel motherboard with that company's Triton chip set, 16MB of EDO RAM, and 512K of external cache. Other off-the-shelf components include



a 2.5GB Enhanced IDE Western Digital hard disk, an 8X Warnes CD-ROM drive, a Telepath V.34 data/fax modem,

AT HOME: The Gateway Destination D5-166 is a hybrid of a high-performance PC and a big-screen TV.

and a 3.5-inch floppy disk drive.

The video card in the Destination sets the technological pace for this PC/TV. Made by STB Systems, the Destination's Video Rage accelerator and 125-channel TV/tuner combination use the Brooktree BtV MediaStream chip set. This PCI card with 2MB of VRAM has inputs for composite and S-Video

as well as a cable-television port.

In contrast with analog television sets, the Destination's STB card and Mitsubishi 31-inch monitor combine to form a totally digital system that displays signals as well as and sometimes better than typical big-screen TV sets. On-board digital scaling lets you use the whole screen for television or shrink the image to whatever size you want.

STB also makes the Destination's wavetable/FM-synthesis sound card, which includes Spatializer 3D audio enhancement. No speakers are included in the standard Destination package, because the company assumes that many users will want to connect their stereo systems through the Destination's line-out jack.

We chose to use the Destination's optional \$699 Harmon Kardon stereo bundle, which includes a Dolby Pro Logic stereo

Continues on page 40

JAVA PROGRAMMING

Symantec Café Pours Java Without the Jitters

By Jay Munro

Symantec Corp.'s Café 1.0 is the first comprehensive, standalone development environment for Java, a Web-centric programming language, on the Windows 95/Windows NT platform. Based on the company's interactive development and debugging environment (IDDE), the \$300 Café does for Java what Symantec C++ did for C programming (First Looks, August 1995). Café provides programmers with everything they need, except the inspiration.

Designed to supplant Sun Microsystems' JDK (Java Development Kit; First Looks, April 9, 1996), Café includes the source

code and samples from the release version of Sun JDK. But Café goes a step further with a complete development environment, including wizards for starting projects and generating default applets, a graphical

source-level debugger, a native Java compiler, and Café Studio for creating Java views and forms.

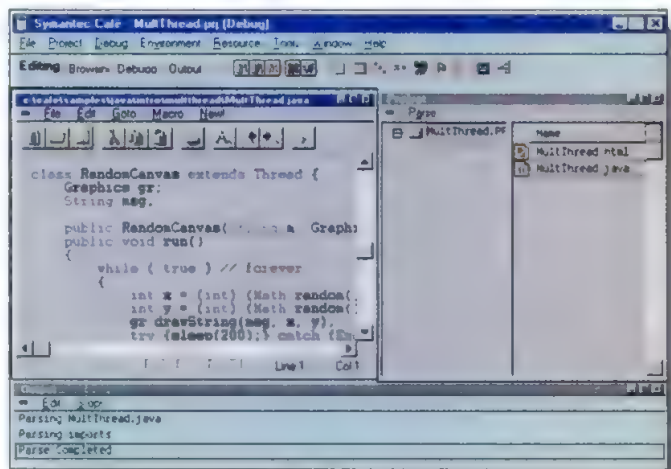
With Symantec's IDDE, almost all these features and options are easily accessible through

Continues on page 42

IN FIRST LOOKS

Netscape Navigator Gold 2.0 ..	44
TranXit Pro ..	44
Microsoft Exchange Server 4.0 ..	48
CoreVideo ..	50
Umax Maxmedia TV/Pro II ..	51
Yamaha YST-M15 Speakers ..	51
Dispatch for MCI Mail 2.0 ..	54
QuickBooks Pro 4.0 for Windows ..	54
Jammer Professional ..	56
Quantum Bigfoot ..	56
SolidWorks 95 ..	60
IrisPen Executive ..	63
Sceptre CD-1112T LCD ..	63
Four Financial Web Sites ..	66

JAVA EDITOR: Like C++, Symantec Café 1.0 supports color-coded keywords, bracket matching, and customizable key configurations.



Gateway Destination

Continued from page 39

receiver; front, center, and rear speakers; and a 50-watt powered subwoofers from JBL. With this option, all we had to do was plug in our VCR and a cable TV connection to create a home-entertainment, -communications, and -computing center.

There are two ways to control the Destination: You can use the wireless keyboard, which includes a touch pad, or you can use the Field Mouse Wireless Remote Control. Operating via a four-channel radio signal, these wireless devices don't have the same range as infrared devices (which means you need to be about 15 feet or less away from the PC), but they're easier to use since you don't have to point them directly at the infrared receiver.

Nobody wants to wait for Windows 95 to boot in order to watch the television or screen a videotape, so the Destination goes into a sleep mode when not in use. Both the keyboard and remote control have power buttons that can instantly wake the Destination up in TV mode.

The system used 38 watts in sleep mode, compared with 104 watts when fully running. This reduced power drain is roughly equal to that of a table radio but is above the Environmental Protection Agency's 30-watt maximum for Energy Star-compliant PCs. Assuming that the Destination were left on in sleep mode 24

At \$2,995, NetTV's WorldVision 2900 is the value alternative to the Gateway 2000 Destination D5-166. The WorldVision 2900 PC/TV includes a Super VGA (800- by 600-pixel resolution) TV/monitor, a Pentium PC with an internal TV tuner, multimedia and communications hardware and software, and an infrared wireless keyboard.

Larger 33-inch and 37-inch combination monitor/TVs are in the works, but NetTV's first model includes a 29-inch screen, which yields a 27.5-inch viewable area. The preproduction monitor we looked at had separate audio and video boards and integrated 6-watt-per-channel speakers on the front. The production monitors will integrate audio and video onto a single board and have speakers on each side. In addition, the vendor says that video quality will be improved.

The WorldVision 2900 includes a 100-MHz Pentium PC with 8MB of RAM, 256K of L2 cache,

a 1GB hard disk, a 4X CD-ROM drive, a Reveal graphics card with 1MB of VRAM, a 125-channel TV tuner, 3-D wavetable sound, a Zoom Telephonics V.34 data/fax modem, a 105-key infrared wireless keyboard with an integrated trackball,

and a game controller. Standard software includes entertainment and reference titles and a software package for blocking and monitoring Internet access called CyberPatrol.

All components but the WorldVision's remote control and game controller have black cases, including the 92-pound, 24.2- by 26.7- by 19.3-inch monitor. The desktop-computer case, called the NetTV Computer-Deck, at 4.2 by 16.9 by 17 inches is the same height and

width as—and just 2.5 inches deeper than—a typical VCR. The wireless keyboard works up to 40 feet away from the small infrared receiver when it's placed in the line of sight.

For performance testing, we added 8MB of



HOME SWEET HOME: The NetTV WorldVision 2900 brings big-screen TV and PC computing to the family room.

hours a day, seven days a week, the power bill would come to approximately \$30 per year.

Software is a key component of the Destination's success. The PC comes with a full range of entertainment, productivity, and reference applications. Harmon Interactive's SmartTV lets you change channels and volume, take screen shots, and schedule the TV to videotape shows auto-

matically with an attached VCR.

The most useful piece of software is the SmartTV Programming Guide. For a fee, SmartTV provides downloadable weekly listings for your area. We really liked the ability to search the listings based on a variety of criteria, such as program title and type, actors and actresses, and ratings. There are also brief critiques of all movies listed. A two-week

subscription is included, after which the service costs \$5.95 per month—slightly more than *TV Guide* costs.

Setup with the Destination was more involved than setup with a typical computer system, particularly since the monitor weighs 132 pounds. Because of this, Gateway recommends that you put the monitor and the system unit in a suitable home-entertainment center rather than on a desk. Gateway provides in-house installation for an additional \$179 (\$219 including the sound system)—and Gateway will take the boxes away.

Once the Destination was up and running, we found it easy to switch between computer and TV modes. It was also easy to log on to the Internet to follow Web and Usenet coverage of the same events we were watching on CNN. We found it a little too easy to mix computing and TV viewing, however. We were able to run applications in the background while watching television,

BENCHMARK TESTS

Home PCs



The Gateway Destination D5-166's results on the ZD Winstone 96 and ZD Graphics WinMark 96 tests were slightly below those posted by the comparably equipped Gateway P5-166 system

(reviewed in "PowerHouse," April 23, 1996). The other two home-oriented PCs were both middle-of-the-road performers.

Each system was equipped with 16MB of RAM and ran Windows 95.

	ZD Winstone 96 (Score)	ZD Graphics WinMark 96 (Mpixels/sec)	ZD Disk WinMark 96 (Score)	ZD CPUMark ₁₆ (Score)	ZD CPUMark ₃₃ (Score)
Gateway Destination D5-166 (P/166)	67	20.9	1,080	323	323
Gateway P5-166 (P/166)*	77	30.3	1,030	326	326
HP Pavilion 7130P (P/133)	47	13.9	712	220	212
NetTV WorldVision 2900 (P/100)	38	10.5	522	167	157

* Reported for comparison

RAM for a total of 16MB. All told, the WorldVision system was an average performer, with no scores wildly high or low.

Television reception with the WorldVision is independent of the computer—unlike with the Destination, which requires the computer to be turned on. The NetTV monitor has two sets of video-input jacks so you can plug in a VCR or cable-converter-box jacks and run the television with the remote control. As a result, the WorldVision's software can block certain channels and can display a dozen TV channels at once for true couch potatoes.

You can use the full screen for the television image with computer applications running in the background, or you can shrink the television window and use computer applications or go online while the television plays in the window. Coming next is NetTV's Pentium/166 version, which includes a faster CD-ROM drive. For now, NetTV's basic WorldVision 2900 is an easy-to-operate PC/TV at an attractive price.—BB

NetTV WorldVision 2900. List price: With Pentium/100 CPU, 8MB RAM, 256K external cache, 1GB hard disk, 4X CD-ROM drive, 29-inch monitor, \$2,995. NetTV Inc., San Rafael, CA; 800-440-6388; <http://www.net-tv.net>. Circle 433 on reader service card.

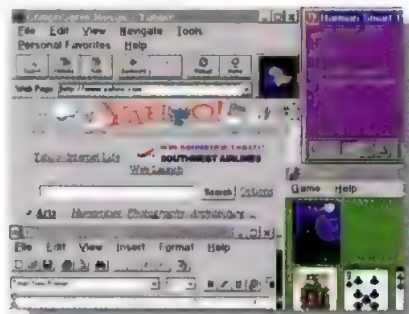
keep a small TV screen active while we worked, or use the big screen and the wireless input devices to play games.

The Destination is not only for families. The system's big monitor can be thought of as an inexpensive addition for fixed-site

monitor for any prolonged period while working on a conventional desktop-computer application. Third, if you want to watch television, your spouse wants to explore the Web, and your kids want to use the Destination for homework, it will be hard to share this system.

If Gateway's vision is accurate, within a few years many family rooms, conference rooms, and classrooms will combine computing, telecommunications, and television in one large-screen system. The Destination is a multimedia jack-of-all-trades.

Gateway Destination D5-166. List price: With Pentium/166 CPU, 16MB RAM, 512K external cache, 2.5GB hard disk, 8X CD-ROM drive, 31-inch monitor, \$4,349. Gateway 2000, North Sioux City, SD; 800-846-2000, 605-232-2000; <http://www.gw2k.com>. Circle 434 on reader service card.



WHAT'S ON: Web access and Harmon Interactive's SmartTV Programming Guide let you move among the TV, games, and the Internet.

presentation systems and for boardrooms.

In terms of computing performance, the Destination was a middle-of-the-road PC. The system's Winstone 96 score of 67 was 13

percent lower than that of Gateway's Editors' Choice-winning home PC, the P5-166 ("PowerHouse," April 23, 1996), and its Graphics WinMark 96 score was off the pace by 30 percent. The results of the remainder of our tests were close to those of the P5-166 system.

The Destination isn't appropriate for all types of computing. First, the monitor isn't capable of resolutions higher than 800 by 600 pixels. This limitation will produce disappointing results when you have many windows open or when you show complicated graphics or digital artwork. Second, although text was sharp and easy to read at a distance, it's hard to imagine sitting close to the enormous

PCs

HP Pavilion Transforms the Home PC into an Image Center

By Alfred Poor

With the addition of a snapshot scanner to Hewlett-Packard Co.'s \$3,398 Pavilion 7130P, it's now just as easy to grab images from photos as it is to get them from a floppy disk.

The sculpted mini-tower case looks similar to that of the HP Pavilion 7090 reviewed in our

crop, enhance, and sharpen photos or perform other edits.

On our tests, the images were generally sharp and clear with no noticeable artifacts. The automatic-exposure settings were good, but using the features in PhotoFinish worked better.

The Pavilion is not the fastest



INSTAMATIC: The built-in scanner on the HP Pavilion 7130P turns snapshots into sharp digital images.

issue of April 23, 1996, but there's also a built-in scanner. Present a photo to this opening and it will be pulled inside while Storm Software's EasyPhoto program is automatically launched. EasyPhoto lets you save your image for use with other Windows applications.

The scanner, which is built by Storm Primax, produces 24-bit color scans at an optical resolution of 400 dots per inch (dpi); with interpolation, you can get a 2,400-dpi scan. The unit can accept originals from 1.2 by 1.6 inches to 5 by 7 inches, but the scanned area is limited to 4.1 by 6.6 inches.

The EasyPhoto software was easy to use and generally worked well, but you may want to use the PC Paintbrush PhotoFinish program, from Softkey. This program uses the scanner's Twain support and makes it easy to

system on the home market; its benchmark test scores place it below average for Pentium/133 systems. But there is more to the Pavilion's mission than raw speed. From the integrated speakerphone and voice mail system to the collection of bundled software to HP's Personal Page interface, this is a complete PC.

The internal color scanner fits in both physically and functionally. The only piece of equipment you'll need in addition to the Pavilion 7130P is a color printer. **HP Pavilion 7130P.** Estimated street price: With Pentium/133 CPU, 16MB RAM, 256K external cache, 1.6GB hard disk, 6X CD-ROM drive, 17-inch monitor, \$3,398. Hewlett-Packard Co., Santa Clara, CA; 800-724-6631; <http://www.hp.com>. Circle 432 on reader service card.

First Looks

Symantec Café

Continued from page 39

a button on the toolbar. All functions are well supported with tooltips and online help.

Café's ProjectExpress wizard jump-starts projects by allowing the user to specify the project's name, type, included files, and directory. You can use ProjectExpress with or without the AppExpress wizard, which builds the boilerplate start-up code for applets or application files.

If you forgo AppExpress, ProjectExpress allows you to create versions for debugging or release, target type (applet or standalone application), and specify the name of the HTML file or main class file. Café, like its C/C++ predecessor, lets you nest projects, creating subassemblies to include in the program as a whole.

ProjectExpress lets you establish the class and browser, including directories. With the original Sun JDK, programmers found source code wouldn't compile or run unless they set environment variables pointing to their classes. Café automatically handles the class paths with the default setup, but the user can override them in individual projects.

AppExpress can be run at any time, though it works best when used with ProjectExpress. AppExpress creates a .JAVA file that contains an applet class or main class, depending on the project options. A simple form file is also created. At this point, you have a complete working Java application, though it is not much use until you expand on it.

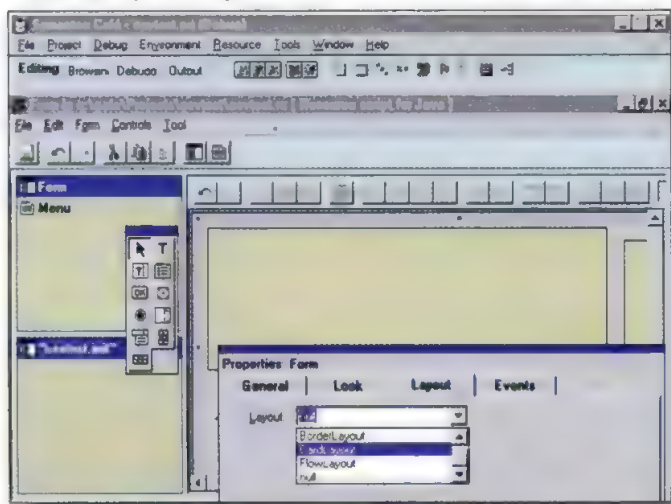
In the tradition of C/C++, the Symantec Editor supports customizable color-coded keywords, bracket matching, and customizable key configurations such as Brief, Emacs, and MSVC. Macro capability is a strong suit in Café. You can assign specific functions to keys, record a series of keystrokes, or write macros in Symantec Basic.

Files can be loaded via the menu, by double-clicking on a selection in the project window, or by dragging and dropping the file

into the editor or onto the icon. A cool feature is the automatic indenting of code and brackets while editing Java source code. During testing, we found we saved time by catching bracket-

fending bug. Double-clicking on any given error takes you directly to the line in the source code.

Symantec will release a "just-in-time" (JIT) compiler later this summer. The JIT compiler com-



CAFÉ STUDIO: Symantec's Resource Editor simplifies the task of creating forms and views for Java programs.

matching bugs as we made them.

For those bugs you don't catch, Café integrates graphical source-level debugging. As with the company's C/C++ debugger, the programmer can set breakpoints and step-into and -over functions and methods and run to a breakpoint. The call chain can be viewed, as

can browsing data and objects in the program. For applets, Café uses a viewer that allows the programmer to watch the GUI portion of the program while stepping through code. The debugger requires TCP/IP. You can also use your favorite browser, configurable under the Tools menu, to view finished applets.

The greatest boon to iterative development is the Symantec Java compiler. This compiler is, in a word, *fast*. On a series of informal speed tests on a large sample file, Café's compiler took one-quarter the time that Sun's Javac compiler did (4 seconds compared with 16 seconds). During compilation, any errors are displayed in the output window, with the type and line number of the of-

piles Java byte codes into native code on the first pass, so the program runs faster on subsequent passes.

For programmers who started with Sun JDK, a real highlight of the program is the Café Studio Resource Editor. From the project-listing window, clicking on the .RC file brings up a dialog box that asks if you want to use Café Studio or receive a text listing of the resource file.

Symantec claims it has used the standard .RC format so that users can import existing C/C++ resource files—but there is a catch. Café Studio creates a file called RESOURCE.K, which contains control ID numbers and other information that if missing will cause an error and cancel the process of loading into the editor. The RESOURCE.K file also causes problems if you create more than one project in a single directory. This only affects loading into Café Studio, not previously loaded Java code. Symantec says it is looking into the problem.

To edit the main form in an applet or application, click on the Form listing and then on the .INIT method listing. The default form comes up in view mode in the studio window. Double-clicking on the form puts it into edit mode, with a toolbox of controls ready to go. To add form elements, simply grab a control from the toolbox and drop it on the form. The toolbox contains standard Java GUI controls: a check box, an Edit button, label, list, Panel, a radio button, and scroll bars. If you want to place an icon or picture on the form, however, you're on your own.

A tabbed dialog box displays the properties and events available for the controls, though it is woefully incomplete. Many properties are missing, such as the size and color of some controls; also missing are some events, such as the paint method. For the methods that are there, editing code is easy: Click on an event and select Edit and the class editor comes up to let you add Java code. When saved, the method and code are put into your .JAVA file.

Using Café Studio to create forms for applets is convenient, though if you change the size of the form, you'll need to modify the accompanying HTML file by hand, since it stays at the original size. In comparison with Sun's Java Workshop or Rogue Wave's Jfactory, Café's handling of events and the limited controls in Café Studio are disappointing, as is the glitch with the RESOURCE.K file.

Despite these rough edges, Symantec Café 1.0 is great for developing Java applications and applets. Symantec won't have the stage to itself for very long—Borland, Microsoft, Rogue Wave, Sun, and Take Five are all waiting in the wings. But Café stands head and shoulders above Sun JDK.

Symantec Café 1.0. List price: \$300. Requires: 8MB RAM (16MB recommended), 25MB to 60MB hard disk space, Microsoft Windows 95 or Windows NT 3.51. Symantec Corp., Cupertino, CA; 800-441-7234, 541-334-6054; <http://www.cafe.symantec.com>. Circle 448 on reader service card.

FIRST LOOKS PLUS

From June 10 to 14, go online to discuss Symantec Café with Jay Munro, a project leader at PC Magazine, and Symantec executives. Type GO EDITOR on CompuServe to join in.

AS LOW AS
\$2250

POWERCD 1330 PTL DUAL-LOCK DISPLAY 166 RAM 350 K.B.

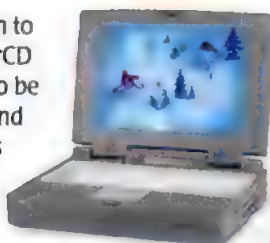
SEE US AT
**COMDEX
SPRING**
BOOTH #749
JUNE 3-6, 1996
McCormick Place



Think of it as a supercomputer with a touchpad.

Move over Hal. Because AMS has given birth to a new, portable giant. We named it the PowerCD Notebook. With a Pentium® Processor waiting to be unleashed, 40MB of RAM ready to perform, and storage space for up to 1.3 Gigs, the PowerCD is truly one super computer.

As one of the most complete, most powerful, feature-rich, multimedia notebooks available today, this small but mighty powerhouse is fully optimized for 75 to 166 MHz Pentium® Processors and will blow the lid off other notebooks. There's a 256KB external level II



secondary cache that gives you a command performance every time. Plus, an internal PowerCard port for networking, high-speed communications and impressing your friends. With the PowerCD's ability to display direct to TV, or effortlessly handle full-screen MPEG video and CD-quality sound, you can give a presentation that's worthy of a sequel.

There you have it. Power. Performance. Features. Available now from AMS. And nobody can touch it. For more information, call 800-868-8108.

- PCI Plug-N-Play System Supports 75 to 166 MHz Pentium® Processor-based CPUs
- Internal 2X/4X/6X CD-ROM with full Digital Audio/Video Support

- 2MB VRAM and 256 Level II Cache for Outstanding Performance
- Supports up to 40MB of RAM and over 1 Gig of Hard Disk Storage

- Built-In PC Card Type III, Wireless Infra-Red and NTSC Direct TV Ports
- Support for Internal Fax/Modem, MPEG Module and AMS PowerCards

- Optional PowerCard Modules include Ethernet, SCSI, ISDN and More
- Full 3 Year Parts and Labor Warranty



800-886-3536
818-813-2391



AMS Tech
Power To Go.
800-868-8108

Contact us via Compuserve: GO AMSONLINE
See us on the web: <http://www.amsnote.com>
TEL: (818) 814-8851 • FAX: (818) 814-0782
CIRCLE 235 ON READER SERVICE CARD



Parts & Labor
Warranty



818-813-2383
818-813-2384

Intel, the Intel Inside logo and Pentium are registered trademarks of Intel Corporation. All other trademarks and registered trademarks are the property of their respective companies. Not responsible for errors in advertising. Prices and specifications are subject to change without notice.

HTML EDITING

Netscape Navigator Gold Builds Simple Web Pages Without Coding

By John Clyman

Netscape Communications Corp.'s \$79 Navigator Gold 2.0 adds basic HTML editing and publishing features to the company's Editors' Choice-winning World Wide Web browser, Navigator 2.01 ("Internet Access: Just Browsing," March 12, 1996). The result is as close to an instant Web-page creation tool as we've seen.

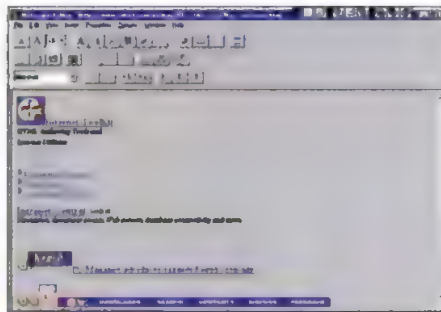
Navigator users will feel at home with Navigator Gold, because the interface is the same. Navigator Gold adds a variety of templates for common page designs so that Web novices will be able to create basic pages painlessly. More sophisticated designs, however, are beyond this program's reach.

Navigator Gold launches in browser mode. Click on a pencil icon in the toolbar and the browser becomes an HTML editor that displays the fonts in near-WYSIWYG fashion. To modify the page's content, you simply position the insertion bar and start typing or cutting and pasting.

Toolbars and drop-down menus provide easy access to tools for inserting images, creating links (including anchor points within the document), and changing text attributes at the touch of a button. Properties boxes let you specify different image attributes, paragraph styles, and text-wrap characteristics.

During our evaluation, we found Navigator Gold made quick work of setting up color schemes (including backgrounds), inserting horizontal lines in varying styles, and performing a variety of basic page-formatting functions. Navigator Gold offers a convenient multilevel undo/re-do capability and provides context-sensitive pop-up menus via the right-hand mouse button.

When you're done with your work, save the file, switch back to



SEEING IS BELIEVING: Navigator Gold provides a near-WYSIWYG view of the Web page you're editing, with HTML tags in yellow.

the browser view, and look over the results. It's no more difficult to use than a word processor, but Navigator Gold doesn't let you exploit many of the HTML extensions that Netscape pio-

neered: Its support for tables is severely limited, and support for frames is absent. Although you can edit an existing table in unrolled form (which means that columns don't appear in the proper format), you can neither change the table's properties nor create a new table from scratch.

Don't try to edit a page that employs frames, because you'll only end up modifying the "noframes" section that's presented to browsers that can't work with frames. You can al-

ways insert HTML tags manually, but it's a somewhat cumbersome process for which Navigator Gold is not well suited.

Oddly, Navigator Gold's browser view sometimes renders line spacing differently than Navigator. Navigator Gold doesn't include a spell-checker, and it provides no mechanism to verify the validity of your HTML code; the Verify button, visible when you're inserting HTML tags manually, doesn't do anything.

Navigator Gold's ease of use is a double-edged sword: It will attract Web neophytes, but the program's limitations will likely frustrate professional Web designers. **Netscape Navigator Gold 2.0.** List price: \$79. Requires: 5MB RAM, 10MB hard disk space, Microsoft Windows 95 or Windows NT. Netscape Communications Corp., Mountain View, CA; 800-638-7483; fax, 415-528-4125; <http://www.netscape.com>. Circle 407 on reader service card.

WIRELESS COMPUTING

TranXit Pro: IrDA Easy as ABC

By Alfred Poor

The \$129.95 TranXit Pro, from Puma Technology, makes the most of a notebook's built-in IrDA infrared-transmission window for moving files between systems or printing.

TranXit Pro includes a copy of TranXit Pro Connectivity Kit, Version 3.2, and a small, bug-eyed infrared transceiver that plugs into your desktop computer's serial port. Setup takes a few minutes. The installation sequence automatically identifies and configures your serial port for the infrared device. We found that the hardware/software combi-

nation worked well in both Windows 3.1 and Windows 95.

Once everything is configured, all you have to do is point the two systems' IrDA windows at each other and start the TranXit Pro software on both computers. The software automatically establishes a link.

TranXit Pro has two main features: File Transfer and PrintPro. The File Transfer screen displays the contents of remote and local disk drives, and you can move or copy files (or the contents of the

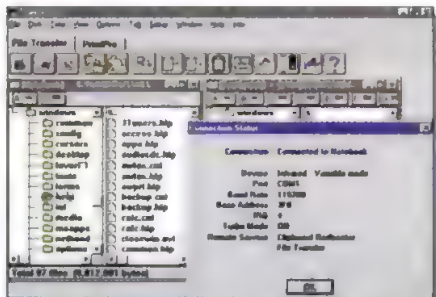
Clipboard) from one window to the other. Built-in file synchronization lets you update the contents of directories and files. PrintPro lets you print directly from the notebook to the desktop PC's printer with the same ease.

If the IrDA top speed of 115 Kbps is too slow, you can use a null-modem or LapLink-style parallel cable with TranXit Pro's interface. TranXit's Remote Install option lets you send the program to another computer.

Because the file-copy, transfer, and synchronization features work on local disk drives as well as across a remote connection, we found that TranXit is also great for file management and archiving.

TranXit Pro provides the flexibility and power needed to use IrDA every day.

TranXit Pro. List price: \$129.95; Connectivity Kit only, \$99.95. Requires: 4MB RAM; 8MB hard disk space; serial, parallel, or IrDA-compliant port; Microsoft Windows 3.1 or later or Windows 95. Puma Technology Inc., San Jose, CA; 800-774-7862, 408-321-7650; <http://www.pumatech.com>. Circle 406 on reader service card.



LOOK, MA, NO WIRES: The TranXit Pro interface helps to configure and monitor the infrared connection between two computers.

the undisputed price/performance leader



February 20, 1996
SAG STF 166 Pentium



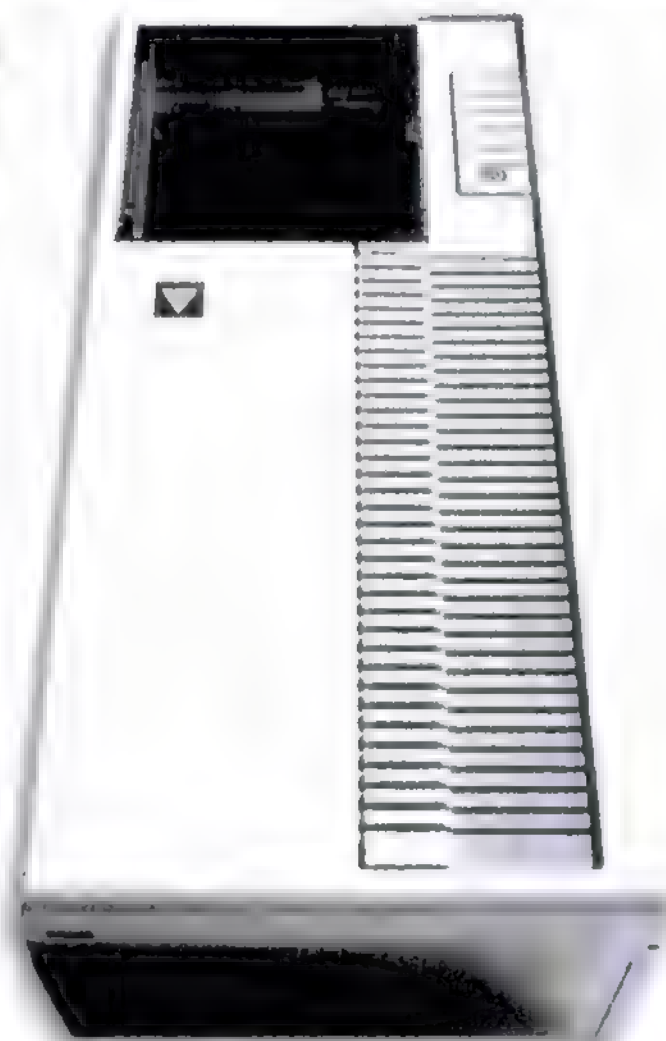
February 20, 1996
SAG STF 150 Pentium



Internet Server SFT Alpha



120MHz Pentium STF 120



"SAG is the clear leader in our price/performance scale. Both systems were top notch performers turning in the best Winstone 96, Graphics Winmark 96 and Disk Winmark. Both are loaded with powerful components."

PC Magazine
February 26, 1996

"SAG is the clear choice for power users. In fact, SAG 120MHz Pentium finished with higher overall performance ratings than other 133MHz systems."

BYTE
December, 1995

SAG ELECTRONICS

MORE SERVER POWER, FOR LESS

1.800.989.3475

FAX 508-689-0189

DO YOU WANT A CUSTOM SYSTEM?

Until SAG, that meant high-priced VARs and other costly consultants.

DO YOU WANT TO SAVE SOME MONEY?

Until SAG, your only options were pre-configured systems and their many limitations.

PRECISION-ENGINEERED POWER SYSTEMS

Now you can have custom quality without compromise. All SAG file servers are precision-built and packed with features. We offer multiple processing, disk mirroring, RAID 5 fault tolerance and more storage capacity at prices far below the industry standard.

For affordable disk arrays, tape backup solutions and RAID 5 technology, SAG Electronics is the acknowledged "High-End Solutions Company."

Dual Pro 200MHz SMP

Pro 150 & 180 Available
Built-in Expandability with SMP Natoma Chipset
1 Intel Pentium Pro 200MHz Processor Pro 200
32MB of EDO RAM Expandable To 1GB
Imagine 128 Series II 128 Bit "3D"
4M VRAM Video
Slots 4 PCI 4 ISA
2940 U/V
2 1GB Ultra Wide
6x CD-ROM
Keyboard Floppy
Mouse
Tower Case 300 Watt

\$3690

Graphics Ultra Station

Imagine 128 Fastest Graphics Drive and Motherboard
Dual SMP Motherboard
166MHz Pentium Processor
512K Pipeline SRAM
Triton II Chipset
16MB EDO RAM Expandable to 512MB
SLOTS 4 PCI 5 ISA
6x CD-ROM Mouse Floppy
Imagine 128 Series II 128 Bit "3D"
4M VRAM Video
2940 U/V
2 1GB Ultra SCS Wide HD
AWE Sound 28.8 Modem
Tower Case 300 Watt

\$3199

RAID 5 Server

DUAL 166MHz SMP
1 Intel Pentium® 166 MHz Processor
512K Cache
16MB RAM Expandable to 512MB
3 Two GB Hard Drives
RAID 5 Controller
SLOTS 3 PCI 5 ISA
12 Bay Tower 8 Removable and Hot Swappable
Two 300 Watt Redundant Power Supplies
Keyboard and 1 44 Floppy
DUAL 166 AVAILABLE

\$5870

Quad 150MHz

Supports Pentium® 90•100•120•150•180 Processors
True 128 Bit Memory Bus Zero Wait State Interleaved 256 Bit Bus
64 Bit CPU Bus Operates at 60MHz with Transfer Rate of 480MB/Sec
2 Intel Pentium® 150MHz Processors Expandable to 4
512K Cache on Each CPU Module
32MB of Memory Expandable to 1.7GB ECC
SLOTS 7 PCI 4 ISA 1 ISA
4GB 7200 RPM SCSI Wide Removable Drive
6x CD-ROM
Keyboard Floppy MS Mouse
12 Bay Tower 400 Watt Redundant Power

\$9999

Hey, look. Another software ad promising to get everyone working together in complete harmony.

Be still, my heart.

We know. You've heard it all before and don't have time for this stuff. Don't worry, we'll get straight to the point.

Lotus SmartSuite® represents a completely new approach to desktop computing – one that no other software suite can offer. The team approach.

TeamReview™ lets users easily solicit feedback by establishing “who” receives a document for review, “what” level of editing rights they'll receive (comment only, read only, or edit only), and “how” the document will be distributed (via floppy disk, e-mail, or Lotus Notes®). Co-workers can then edit using review and comment tools like a highlighter pen, revision marking, or electronic comment notes.

Then, with TeamConsolidate™, the author can review everyone's edits on one screen and accept or reject the input



they've received by the paragraph, line or word. It only takes one click of a button to collapse accepted comments into one revised document. (Uh oh. Impatient finger tapping. Better pick up the pace.)

With SmartSuite's electronic team features, everyday mundane tasks disappear, leaving more time for your people to do what they do best. It's also been optimized for Windows® 95 to deliver even greater functionality and productivity.

And now with LotusScript™, the BASIC-compatible scripting language, you can easily customize your SmartSuite applications to get your users working even better together.



Obviously this isn't ordinary office suite software. Ask the folks at PC Week. They gave it the "Analyst's Choice Award" for best Windows 95 suite over

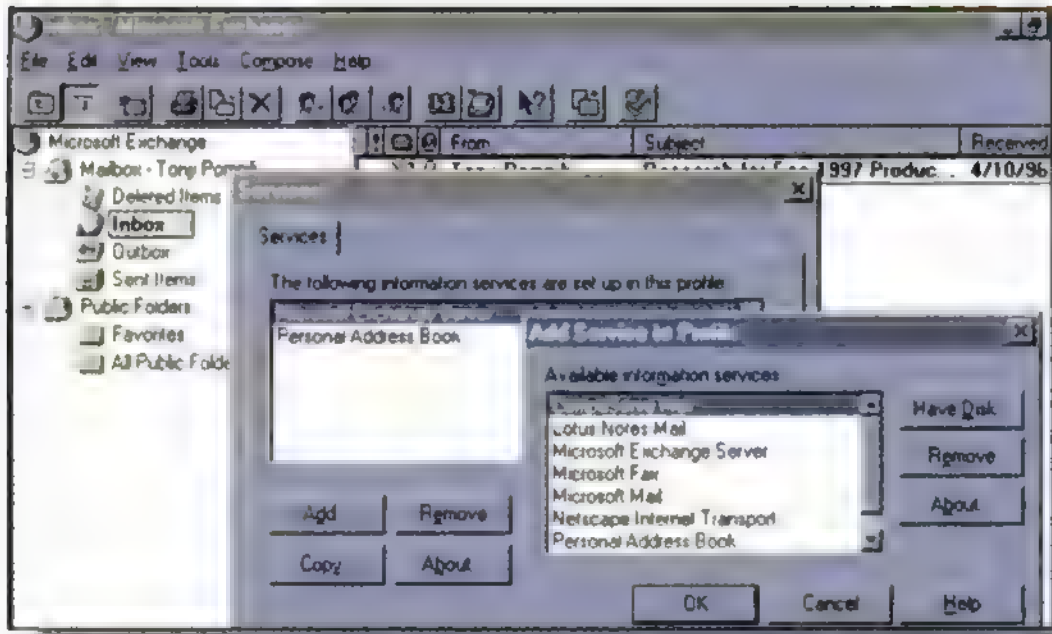
Microsoft Office.

Versions of SmartSuite are available for Windows 95, Windows 3.1 and OS/2®, and SmartSuite is now included with Aptiva®, ThinkPad® and most IBM® PC desktops as well as select Acer®, AST® and Epson® PCs.

Don't take our word for it, try Lotus SmartSuite for yourself. Call 1-800-TRADE-UP, ext. B889 today, and order the brand new Lotus Gallery CD. It's free and comes complete with a 45 day trial version of SmartSuite. Or visit us on the World Wide Web at www.lotus.com.

Thank you for your time.
Bye now.

Lotus
Working Together



COMMUNICATIONS

Microsoft Exchange Delivers Client/Server Messaging

By Tony Pompili

Microsoft's long-awaited next-generation messaging system, Microsoft Exchange Server 4.0, is finally here. Exchange is a powerful solution for those looking for the efficiency of client/server architecture and distributed administration. Exchange Client 4.0 extends the program's universal-mailbox features.

Client-access licenses are about \$54 each. The Exchange Server Enterprise Edition, which includes a variety of connectors, costs \$1,970. A streamlined version of Server is priced at \$529.

The Exchange Server is the engine of Microsoft's corporate messaging system. Designed to route messages over LANs or WANs within single- or multi-server organization-wide sites, Exchange has workgroup-like features, such as Public Folders, that let groups of users share information in discussion-like databases and basic tools for customizing message forms and views. Using gateways or Connectors, Exchange can send and receive mail with clients such as Microsoft Mail or any system using Internet SMTP gateways. Exchange Clients are available for all Windows platforms as well as DOS, and a Macintosh client is expected this summer. Exchange Server is limited to x86, MIPS, or

Alpha-based systems.

Exchange fits snugly into the Microsoft networking scheme by running on Windows NT and piggybacking on many basic Windows NT services. For example, Exchange Administrator or Windows NT Administration applications will guide you through the process of creating both Windows NT and Exchange users. Windows NT Performance Monitor scripts allow you to track server users and server load.

The entire Exchange system uses RPC (remote procedure calls) to communicate between servers and between clients and servers. Exchange works with any of the Windows NT protocols, including IP, IPX, and NetBEUI. We tested Exchange on a system running Windows NT Server 3.51 with Service Pack 4.

Using the Exchange Administrator, you can add users and groups as well as other Exchange servers. The Exchange Administrator extends Windows NT's relatively flat, hierarchical domain structure with a tree-like structure similar to Novell's NDS (NetWare Directory Services), making it easier to organize and find resources. This information is stored in Exchange's Directory Services. To ensure that all Exchange servers have up-to-date information, Exchange includes its own directory-synchronization

LETTER CARRIER: *The Exchange Client works with a variety of back-end mail services, including CompuServe, Lotus Notes, and Microsoft Mail.*

facilities for replicating directories over Microsoft's Site Connector or any of the Connectors, including SMTP or X.400.

A drawback to Exchange is its inability to extend its native messaging format beyond a single domain. For example, you need a Microsoft Mail, SMTP, and X.400 Connector to send mail between domains, thereby reformatting messages to a more basic, non-rich-text form.

The new Exchange server is also tightly integrated with other BackOffice applications and the Internet. Using the Internet Connector and Internet Information Server (IIS), you can easily make views and messages in your Exchange databases available through Web browsers.

Exchange 4.0 includes a new Exchange Client. Windows 95 users will have to upgrade to the new client from the version that shipped with the OS. The Exchange Server actually works with any MAPI 1.0-compliant client. For example, you could use Microsoft Mail 3.2 as your client and use MAPI mail files, or MAPI Stores, on an Exchange server.

Exchange Client 4.0 is functionally nearly identical to the Windows 95 Exchange Client. Billed as the universal mailbox, the Exchange Client can view and send messages using a variety of back-end messaging systems, including CompuServe, the Internet, Lotus Notes, Microsoft Mail, and faxes. You use profiles to manage your various SPIs and Public and Private Stores.

Exchange Stores can contain nearly any type of file. Exchange supports OLE 2.0 for in-place editing of embedded objects and drag-and-drop. A file can be dragged into a view and the view will automatically inherit the file attributes.

You don't have to work directly on a LAN to take advantage of Exchange. Using RAS (Remote Access Service) and Exchange message-based replication, users can create and read messages offline, save them in a local Store, and later dial in to exchange mail with the server. For Windows 3.1 users, Microsoft includes Shiva-Remote software for creating RAS connections.

Like products such as Lotus cc:Mail, Exchange allows you to set up rules for handling messages automatically. For example, you can tell Exchange to reply automatically to messages when you are on vacation or place selected messages into a priority folder.

The included Exchange Forms Designer lets you create and customize basic forms, such as mail or expense sheets. Designer forms are actu-

ally runtime Visual Basic applications. Microsoft expects third-party developers to use tools such as C, Visual Basic, or other lower-level applications to customize Exchange. One such application, provided by Microsoft, is an Exchange version of Schedule+ that lets users view meeting and other shared scheduled updates in their mail databases.

Although most companies dread the idea of changing messaging systems, Exchange deserves some serious consideration. Its centralized hierarchical directory-service and administration features are great advantages for managing large networks, and MAPI 1.0 gives sites the flexibility to use a variety of clients.

Microsoft Exchange Server 4.0. Estimated street price: \$529; Exchange Server Enterprise Edition, \$1,970. (Client-access licenses, \$54.) Requires: 32MB RAM, 250MB hard disk space, Microsoft Windows NT Server 3.51 with Service Pack 4. Microsoft Corp., Redmond, WA; 800-426-9400, 206-882-8080; <http://www.microsoft.com>. **Circle 431** on reader service card.

FIRST LOOKS PLUS

From May 27 to 31, go online to discuss Microsoft Exchange with Tony Pompili, a contributing editor of PC Magazine. Type GO EDITOR on CompuServe.

TOMORROW'S TECHNOLOGY TODAY!



THE MICRON

Unleashing up to 166MHz of Pentium® processor power, the Micron Millennium surpasses established benchmarks to create a whole new level of unbridled computing performance.

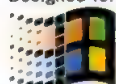


Continuing to triumphantly sweep the PC industry's most coveted awards, the Micron Millennium line was recently recognized with PC Magazine's "Best Products Of 1995" award.



The Millennium series, legendary for blistering speed and outstanding value, will handle the most challenging applications—right now! So if your style is to work hard and fast, the Micron Millennium is designed just for you.

Designed for



Microsoft®
Windows®95



MILLENNIA P150

- Intel 150MHz Pentium processor
- 256K pipelined burst cache, flash BIOS
- 8X EIDE CD-ROM drive, 3.5" floppy drive
- 16-bit stereo sound & speakers
- PCI 64-bit, 3D video, MPEG, 2MB EDO
- Tool-free mini-tower or desktop
- Microsoft® Mouse, 104-key keyboard
- Microsoft Windows® 95 CD & MS Plus! CD
- 5-year/3-year Micron Power™ warranty*



- A** • 8MB EDO RAM • 1.0GB EIDE hard drive
• 15" Micron 15FGx, .28dp (13.7" display)
• Microsoft Works 95 CD

\$1,999

Business lease \$68/month

- B** • 16MB EDO RAM • 1.6GB EIDE hard drive
• 15" Micron 15FGx, .28dp (13.7" display)
• Microsoft Office Pro 95 & Bookshelf 95 CDs

\$2,399

Business lease \$82/month

- C** • 32MB EDO RAM • 2.1GB EIDE hard drive
• 17" Micron 17FGx, .26dp (15.8" display)
• Microsoft Office Pro 95 & Bookshelf 95 CDs

\$3,199

Business lease \$109/month

- With 166MHz Pentium processor.....add \$100
- With 133MHz Pentium processor.....subtract \$100

MILLENNIA PLUS P166

- Intel 166MHz Pentium processor
- 256K pipelined burst cache, flash BIOS
- PCI 32-bit Ultra SCSI Fast-20 controller
- 8X SCSI-2 CD-ROM drive, 3.5" floppy drive
- 16-bit stereo sound & speakers
- PCI 64-bit, 3D video, MPEG, 2MB EDO
- Tool-free mini-tower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows 95 CD & MS Plus! CD
- Microsoft Office Pro 95 & Bookshelf 95 CDs
- 5-year/3-year Micron Power warranty*



- A** • 16MB EDO RAM • 1.0GB Fast SCSI-2 hard drive
• 15" Micron 15FGx, .28dp (13.7" display)

\$2,799

Business lease \$95/month

- B** • 32MB EDO RAM • 2.0GB Fast SCSI-2 hard drive
• 15" Micron 15FGx, .28dp (13.7" display)

\$3,599

Business lease \$122/month

- C** • 64MB EDO RAM • 4.0GB Fast SCSI-2 hard drive
• 17" Micron 17FGx, .26dp (15.8" display)

\$4,999

Business lease \$170/month

- With 150MHz Pentium processor.....subtract \$100

MILLENNIA



Micron computers are winning critical acclaim for their exceptional quality, record-breaking speeds and dependable performance. Recognized regularly for technical excellence and for outstanding customer service and technical support, Micron computers have been chosen for *PC*

Magazine's "Best Products of 1995" and

"Editor's Choice" five times, *PC World's* "Best Buy" over

50 times, *PC Computing's* 1995

MVP award and *Computer*

Shopper's "Best Buy of 1995."

Micron received the highest

scores in *PC Magazine's* "1995



Service and Reliability" survey

in the four categories of

"Customer Satisfaction with

Reliability," "Repair

Experience," "Technical Support" and

"Future Likelihood of

Buying Again."



"The Millennium is nothing short of the best all-around PC available on the market today."

—*PC Magazine*, April 25, 1995



December 1995
MILLENNIA P133

"... we tested the latest PCs until they begged for mercy and found a no-compromise choice: Micron's Millennium P133."

—*PC Computing*, December 1995

800-388-6334

<http://www.mei.micron.com>

MICRON
ELECTRONICS, INC.

AWARD-WINNING SYSTEMS

SERVERS

POWERSERVER SMP P133

- Intel 133MHz Pentium® processor
- Dual Pentium SMP ZIF sockets
- 512K write-back cache, flash BIOS
- Slots: 5 EISA, 2 PCI, 1 EISA/PCI
- PCI 32-bit Ultra SCSI Fast-20 controller
- 8X SCSI-2 CD-ROM drive, 3.5" floppy drive
- PCI 64-bit video, MPEG, 2MB EDO
- Full-size tower with 10 drive bays
- Microsoft® Mouse, 104-key keyboard
- Microsoft Windows® 95 CD & MS Plus! CD
- 5-year/3-year Micron PowerSM warranty*



A • 16MB RAM • 1GB SCSI-2 hard drive
 • 15" Micron 15FGx, .28dp (13.7" display)
\$2,899 Business lease \$99/month

B • 32MB RAM • 2GB SCSI-2 hard drive
 • 15" Micron 15FGx, .28dp (13.7" display)
\$3,699 Business lease \$126/month

- With second 133MHz Pentium processor.....add \$399
- With Windows NT Workstation 3.51 CD.....add \$99

POWERSERVER SMP P266

- Dual 133MHz Pentium processors
- 512K write-back cache, flash BIOS
- Slots: 5 EISA, 2 PCI, 1 EISA/PCI
- PCI 32-bit Ultra SCSI Fast-20 controller
- 8X SCSI-2 CD-ROM drive, 3.5" floppy drive
- PCI 64-bit video, MPEG, 2MB EDO
- Full-size tower with 10 drive bays
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows NT Workstation 3.51 CD
- 5-year/3-year Micron PowerSM warranty*



A • 32MB RAM • 2GB SCSI-2 hard drive
 • 15" Micron 15FGx, .28dp (13.7" display)
\$3,999 Business lease \$136/month

B • 64MB RAM • 4GB SCSI-2 hard drive
 • 17" Micron 17FGx, .26dp (15.8" display)
\$5,399 Business lease \$170/month



POWERSERVER SMP P133



Exceptional speed, performance and reliability are just a few of the reasons

Micron is a technology leader in PC design.

From the award-winning PowerStation to the PowerServer SMP P266, Micron offers a complete range of dependable products to suit every need. When you're considering your next PC purchase, consider a Micron PC.

POWERSTATION P100

- Intel 100MHz Pentium processor
- 8X EIDE CD-ROM drive, 3.5" floppy drive
- 16-bit stereo sound & speakers
- PCI 64-bit video, MPEG, 2MB EDO
- Tool-free mini-tower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows 95 CD & MS Plus! CD
- 5-year/3-year Micron Power warranty*



A • 8MB EDO RAM • 1.0GB EIDE hard drive
 • 15" Micron 15FGx, .28dp (13.7" display)
 • Microsoft Works 95 CD
\$1,699 Business lease \$58/month

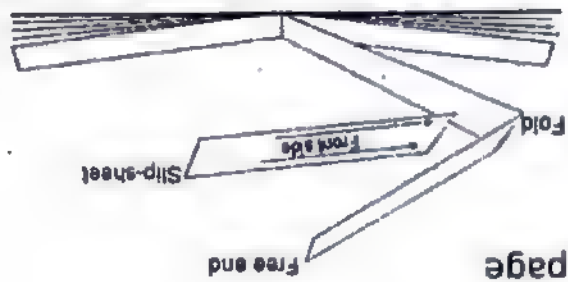
B • 16MB EDO RAM • 1.6GB EIDE hard drive
 • 15" Micron 15FGx, .28dp (13.7" display)
 • Microsoft Office Pro 95 & Bookshelf 95 CDs
\$2,099 Business lease \$71/month

POWERSTATION LX P100

- Intel 100MHz Pentium processor
- 8MB EDO RAM • 1.0GB EIDE hard drive
- 3.5" floppy drive, flash BIOS
- PCI 64-bit graphics accelerator (1MB)
- 15" Micron 15FGx, .28dp (13.7" display)
- Tool-free mini-tower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows 95 & MS Plus!
- Microsoft Works 95
- 5-year/3-year Micron Power warranty*

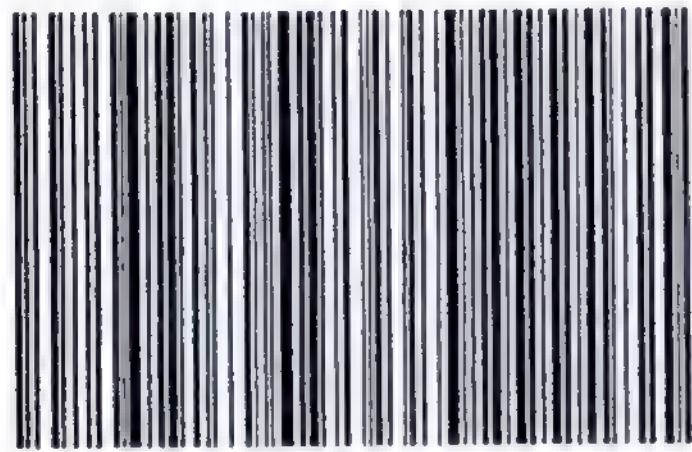


\$1,499 Business lease \$51/month



1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet

Inverted Foldout slip-sheet

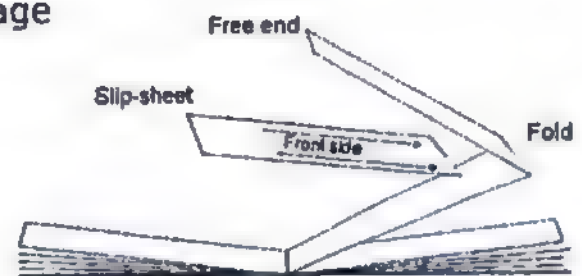


GbsSlipSheet-001

Foldout slip-sheet

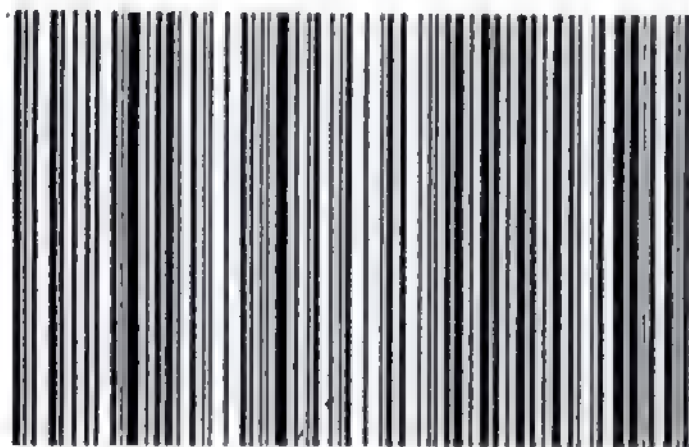
Folded edge of the page

1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



1. Follow instructions on the other side

Inverted Back

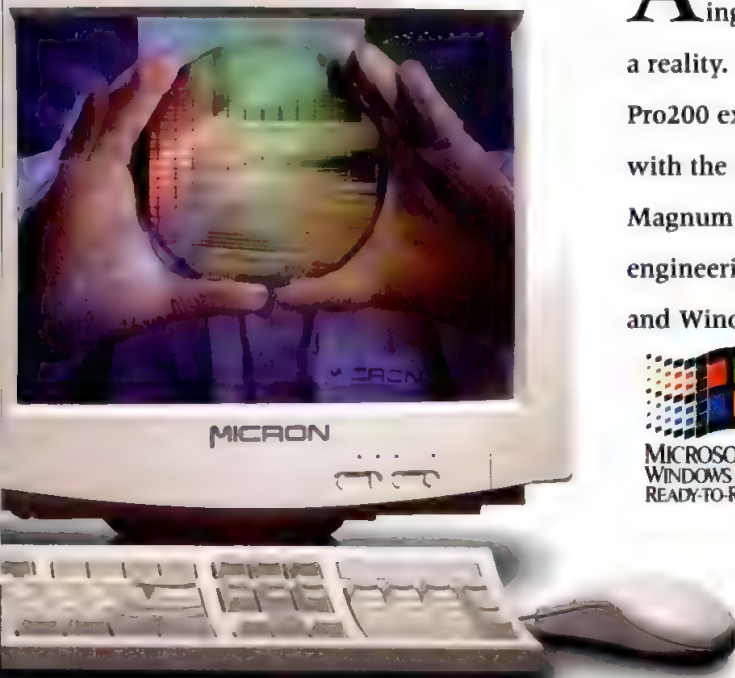


Gbs5lpBack-0018

Back

1. Follow instructions on the other side

PRO MAGNUM



Again, Micron leads the industry by making affordable workstation performance a reality. The new Micron Magnum Plus Pro200 expands the limits of a workstation



with the most advanced components available. The Magnum Plus Pro200 system combines superior Micron engineering with Intel's advanced Pentium® Pro processor and Windows® NT for the fastest, most reliable system on the market today. The Micron Magnum Plus Pro200—just what you'd expect from Micron Electronics, the technology leader.



MAGNUM PLUS Pro200

- Intel 200MHz Pentium Pro processor
- 256K internal cache, flash BIOS
- PCI 32-bit Ultra SCSI Fast-20 controller
- 8X SCSI-2 CD-ROM drive, 3.5" floppy drive
- 16-bit stereo sound & speakers
- PCI 64-bit video, MPEG, 2MB EDO
- Tool-free mini-tower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows NT Workstation 3.51 CD
- Microsoft Office Pro 95 & Bookshelf 95 CDs
- 5-year/3-year Micron Power warranty*



A • 32MB RAM • 2GB Fast SCSI-2 hard drive
• 15" Micron 15FGx, .28dp (13.7" display)
\$4,399 Business lease \$150/month

B • 64MB RAM • 4GB Fast SCSI-2 hard drive
• 17" Micron 17FGx, .26dp (15.8" display)
\$5,799 Business lease \$182/month

C • 128MB RAM • 9GB Fast SCSI-2 hard drive
• 21" Micron 21FGx, .26dp (20.0" display)
\$9,499 Business lease \$298/month

MAGNUM Pro150

- Intel 150MHz Pentium Pro processor
- 256K internal cache, flash BIOS
- 8X EIDE CD-ROM drive, 3.5" floppy drive
- 16-bit stereo sound & speakers
- PCI 64-bit video, MPEG, 2MB EDO
- Tool-free mini-tower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows NT Workstation 3.51 CD
- Microsoft Office Pro 95 & Bookshelf 95 CDs
- 5-year/3-year Micron Power™ warranty*



A • 16MB RAM • 1.0GB EIDE hard drive
• 15" Micron 15FGx, .28dp (13.7" display)
\$2,999 Business lease \$102/month

B • 32MB RAM • 1.6GB EIDE hard drive
• 17" Micron 17FGx, .26dp (15.8" display)
\$3,799 Business lease \$129/month



*MICRON POWER™ WARRANTY & SUPPORT

- 5-year limited warranty on microprocessor and main memory • 3-year limited parts-only system warranty
- 1-year optional on-site service agreement • 30 days of free Micron-supplied software support
- 30-day money-back policy • 24-hour technical support

All sales are subject to Micron's standard limited warranties and terms and conditions of sale. Copies of the limited warranties may be obtained by calling Micron.

800-388-6334

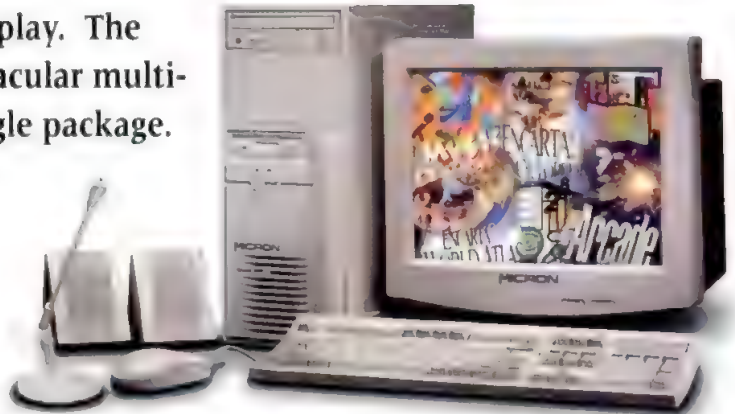
<http://www.mei.micron.com>

MICRON

ELECTRONICS, INC.

MICRON HOME MPC

Reinvent the meaning of work and play. The Micron Home MPC presents a spectacular multimedia experience complete in a single package. The only limit is your imagination.



HOME MPC P100

- Intel 100MHz Pentium® processor
- 256K pipelined burst cache, flash BIOS
- 8MB EDO RAM • 1.0GB EIDE hard drive
- 8X EIDE CD-ROM drive, 3.5" floppy drive
- 16-bit stereo sound & speakers
- 28.8 fax/modem, speakerphone, voice mail
- Microsoft Phone telephony software
- **Internet ready**
 - Internet in a Box from CompuServe®/Spry
 - Internet Explorer
- Prodigy®, America Online® & CompuServe trial memberships
- PCI 64-bit, 3D video, MPEG, 2MB EDO
- 15" Micron 15FGx, .28dp (13.7" display)
- Tool-free mini-tower or desktop
- Microsoft® Mouse, 104-key keyboard
- Microsoft Windows® 95 CD & MS Plus! CD
- **Microsoft Home Pak includes:** Works 4.0 for Windows 95; Publisher Deluxe for Windows 95; Encarta® 96; Encarta 96 World Atlas; Music Central™ 96; Wine Guide; Arcade 1.0; Scenes—Sports Extremes Collection; Cinemania® 96; Julia Child Home Cooking; Best of Windows Entertainment Pack; Money 4.0 for Windows 95; CD Sampler (includes Fury® game demo)
- 5-year/3-year Micron Power™ warranty*



\$1,999

- With 133MHz Pentium processor.....add \$100

HOME MPC P150

- Intel 150MHz Pentium processor
- 256K pipelined burst cache, flash BIOS
- 16MB EDO RAM • 1.6GB EIDE hard drive
- 8X EIDE CD-ROM drive, 3.5" floppy drive
- 16-bit Wavetable 3D stereo sound
- Advent AV270 2x25 watt stereo speakers
- 28.8 fax/modem, speakerphone, voice mail
- Microsoft Phone telephony software
- **Internet ready**
 - Internet in a Box from CompuServe/Spry
 - Internet Explorer
- Prodigy, America Online & CompuServe trial memberships
- PCI 64-bit, 3D video, MPEG, 2MB EDO
- 17" Micron 17FGx, .26dp (15.8" display)
- Tool-free mini-tower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows 95 CD & MS Plus! CD
- Microsoft Office 95 & Bookshelf 95 CDs
- **Microsoft Home Pak includes:** Works 4.0 for Windows 95; Publisher Deluxe for Windows 95; Encarta 96; Encarta 96 World Atlas; Music Central 96; Wine Guide; Arcade 1.0; Scenes—Sports Extremes Collection; Cinemania 96; Julia Child Home Cooking; Best of Windows Entertainment Pack; Money 4.0 for Windows 95; CD Sampler (includes Fury® game demo)
- 5-year/3-year Micron Power warranty*



\$2,999

- With 166MHz Pentium processor.....add \$100

Microsoft Home software is the most spectacular collection of educational and entertainment software assembled in a single package. There's something everyone in the family will love from the fabulous new Encarta 96 World Atlas, exclusive with a Micron Home MPC, to the assortment of exciting games in Best of Windows Entertainment Pack.



International Sales
208-893-8970



International Fax
208-893-8993



Tollfree from Canada
800-708-1758



Tollfree from Puerto Rico
800-708-1756



Tollfree from Mexico
95-800-708-1755

• 900 E. Karcher Road, Nampa, ID 83687
• Mon-Fri 6am-10pm Sat 7am-5pm (MT)
• International Sales Hours: Mon-Fri 6am-7pm (MT)
• 208-893-1434 • Fax 208-893-1424
• Purchase Order Fax 208-893-8992
• Technical Support Available 24 Hours A Day-7 Days A Week
• Technical Support E-mail: techsupport.micron@micron.com

©1996 Micron Electronics, Inc. All rights reserved. All prices and specifications subject to change without notice. Micron Electronics, Inc. is not responsible for omissions and/or errors in typography or photography. Intel, Intel Inside and Pentium are registered trademarks of the Intel Corporation. Microsoft is a registered trademark and Windows, Windows NT and the Windows logos are trademarks of Microsoft Corporation. Micron Power is a service mark of Micron Electronics, Inc. All other company trademarks are trade names of each respective company. Prices do not include shipping and handling. 30-day money-back policy does not include return freight and original shipping/handling charges, applies only to Micron brand products and begins from date of shipment. All returns require RMA numbers and must be shipped in the original condition prepaid and insured. Lease prices based on 36-month lease.

FAM- PCMG-9806A



*MICRON POWER™ WARRANTY & SUPPORT

- 5-year limited warranty on microprocessor and main memory
- 3-year limited parts-only system warranty
- 1-year optional on-site service agreement
- 30 days of free Micron-supplied software support
- 30-day money-back policy
- 24-hour technical support

All sales are subject to Micron's standard limited warranties and terms and conditions of sale. Copies of the limited warranty may be obtained by calling Micron.

800-388-6334

<http://www.mei.micron.com>

MICRON
ELECTRONICS, INC.

YOU WANT MORE?

Custom configure your new Micron system with our most popular options.

MULTIMEDIA OPTIONS

- Creative Labs SoundBlaster™ 32 Wavetable sound card\$59 *
- Creative Labs SoundBlaster 32 Wavetable sound card w/2MB RAM\$149 *
- Advent AV270 Powered Partners stereo speakers\$99
- Advent AV370 Powered Partners stereo speakers w/subwoofer\$199
- Microsoft® SideWinder 3D Pro joystick\$59



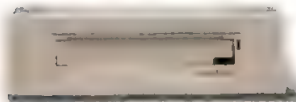
QUICKEN® FINANCIAL PAK

- Quicken Financial Pak, including: Quicken Deluxe 5.0; Quicken Financial Planner™; Quicken Parents' Guide to Money™; Quicken Family Lawyer™\$69



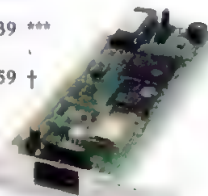
STORAGE/MEDIA OPTIONS

- Plextor EightPlex 8X 1.2MB/s SCSI internal CD-ROM drive\$200 ** (upgrade from systems with standard 8X EIDE CD-ROM drive)
- Iomega SCSI Jaz drive with 1.0GB removable cartridge\$399 **
- Iomega Zip IDE drive with 100MB removable cartridge\$99
- Iomega Ditto 800 (400/800MB) Travan Tape back up w/tape\$149
- Iomega Ditto 3200 (1.6/3.2GB) Travan Tape back up w/tape\$299
- Conner 4/8GB DDS-2 DAT SCSI Tape back up\$999 **



COMMUNICATION OPTIONS

- 28.8bd V.34 internal data/fax modem\$139 ***
- 28.8bd V.34 internal Telephony data/fax modem w/full duplex speakerphone and voice mail\$159 †



NETWORKING OPTIONS

- NE2000 Compatible Ethernet ISA NIC (BNC & RJ-45)\$49
- 3COM 3C509 Ethernet ISA NIC (BNC, AUI & RJ-45)\$99
- 3COM 3C595 Fast Etherlink PCI 10/100 NIC (RJ-45 only)\$159
- SMC ISA TokenCard network card\$199

- * Upgrade from systems with standard SoundBlaster™ 16 sound card
- ** Requires SCSI Host Adapter
- *** V.34 modem includes trial memberships to CompuServe®, Prodigy® and America Online®
- † Requires sound card
- †† Upgrade from systems with standard Micron 17" 17FGx color monitor
- ††† Upgrade from systems with standard 64-bit 2MB video card

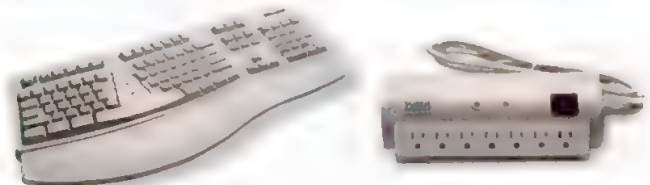
DISPLAY/VIDEO OPTIONS

- 17" Hitachi SuperScan 1711 (15.9" display) .26dp color monitor.....\$100 ††
- 21" Hitachi SuperScan 2111 (20" display) .26dp color monitor.....\$1000 ††
- Diamond Stealth64 video card w/2MB VRAM.....\$150 †††
- Diamond Stealth64 video card w/4MB VRAM.....\$300 †††
- #9 Imagine 128 video card w/4MB VRAM.....\$500 †††
- #9 Imagine 128 video card w/8MB VRAM.....\$750 †††



OTHER OPTIONS

- APC Per7T surge suppressor\$39
- APC Pro7T surge suppressor\$69
- Microsoft Natural Keyboard\$49



800-707-2329
<http://www.mei.micron.com>
MICRON

ELECTRONICS, INC.

900 E. Karcher Road, Nampa, ID 83687

Mon-Fri 6am-10pm Sat 7am-5pm (MT)

International Sales Hours: Mon-Fri 6am-7pm (MT)

208-893-3434 • Fax 208-893-3424

Purchase Order Fax 208-893-8992

Technical Support Available 24 Hours A Day-7 Days A Week

Technical Support E-mail: techsupport.meic@micron.com

VIDEOCONFERENCING

CorelVideo Delivers Desktop Conferencing That Doesn't Tie Up the Network

By Steve Rigney

With the exception of a new virus, nothing scares a network administrator more than the idea of running desktop videoconferencing over the existing local area network (LAN). Corel Corp.'s CorelVideo changes all that. At \$499 per user for a 16-client license, CorelVideo delivers a lot for a little. The system offers powerful features, including data sharing, personal video phone books, video broadcasts, call forwarding, and tight security.

CorelVideo piggybacks on your existing network infrastructure to move audio, video, and data among clients without interfering with your present data network. Most LANs use Ethernet running over Category 5 unshielded twisted-pair (UTP) cable. The data network uses two of the four pairs of wire in Category 5 UTP. CorelVideo employs a combination of one unused pair of wires and a centralized video switch, keeping all of the audio and video packets off your data network.

PRICE VS. COST

The \$499 price tag is just the start, because CorelVideo includes the client software and the required video card but nothing more. To make it work, CorelVideo also requires a video overlay card and a high-quality video camera for each client PC. For our evaluation, we used Corel's \$499 CorelCAM; expect to pay as much as \$1,200 per seat for everything you'll need.

CorelVideo currently works only with Windows 95, but a Windows NT version should be available by the time you read this. Corel is also promising a Windows for Workgroups version.

The three pieces of the CorelVideo hardware puzzle are clients, servers, and hubs. The client PC uses a box called the Corel

Console to communicate with a video card in each desktop PC. In addition, the video line card communicates between the hub and your network cable through a punch-down block.

The key is that the CorelVideo system relies on clients sending and receiving the video signal as analog—not digital—data.

The good news is that you can

that includes a video codec.

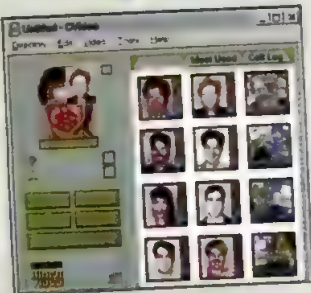
We were impressed with CorelVideo's Phone Book, which not only allows you to see a picture of the person you want to call but also includes other information, such as the person's e-mail address. You can start a videoconference with anyone by clicking on the appropriate Phone Book image.

CorelVideo extends video-

SEE ME, HEAR ME



COMMAND CENTER: The CorelConsole, the heart of CorelVideo's hardware, has many connection possibilities (above). The \$499 video camera, CorelCAM, worked well with the system (directly below). CorelVideo's Phone Book makes videoconferencing as easy as using a phone (below left).



run the server software on the PC, which can act as a hub. The bad news is that CorelVideo's hardware installation is complicated and should be left to the network administrator.

The video line card in the hub can handle as many as 16 clients, and you can daisy-chain up to six of these cards in a single server to connect up to 96 CorelVideo users. For more than 96 users, you'll need to use a trunk adapter to link multiple hubs together. If you need remote access, you can install a Corel ISDN card

conferencing by applying many of the features we take for granted in modern telephones, such as the ability to put callers on hold, transfer a call, or even use a speed-dial feature for frequently called numbers. A unique ability is CorelVideo's broadcast feature, which is a great way to distribute a speech, live demonstration, or press conference.

FREEZE-FRAME

You can also set up what CorelVideo calls a Freeze-Frame. This is essentially a picture of you or

your empty desk—depending on whether you're there or not—that is transmitted every few minutes.

With coworkers and supervisors able to peek in electronically to see if you're there, CorelVideo raises personal-privacy issues. Corel built in several security screens to ensure your ability to remain anonymous. You can choose not to show your picture in the Phone Book, turn off the Freeze-Frame feature, or even decide which users can view you at your desk. Our favorite was the optional "Do Not Disturb" sign.

All of the CorelVideo options can be controlled by the server-administration utility. There are logs to track usage. CorelVideo also lets you monitor the server and hub.

Throughout testing, the images and sound that CorelVideo produced were sufficient for videoconferencing. We were consistently able to transmit and receive a video stream of about 20 frames per second, which puts CorelVideo into the mainstream of network-based videoconferencing products.

We found that the quality of the sound and images depends as much on your monitor and speakers as on CorelVideo itself. For example, images on a 16- or 256-color monitor tend to look blotchy and unnatural, and a cheap pair of unamplified speakers can sound similar in quality to an AM-radio broadcast.

CorelVideo's awkward setup and current lack of support for Windows 3.1 and the Macintosh are key shortcomings that will have to be overcome. But the system makes videoconferencing as easy as using a telephone and provides an inexpensive way to take advantage of underutilized network infrastructure.

CorelVideo. List price: \$499. Requires: Server and hub: 16MB RAM, 10MB hard disk space, Microsoft Windows 95. Clients: 16MB RAM, 10MB hard disk space, Windows 95. Corel Corp., Ottawa, Ontario, Canada; 800-772-6735; fax, 613-761-9176; <http://www.corel.com>. Circle 429 on reader service card.

SCAN CONVERTERS

Umax's Maxmedia TV/Pro II Takes PC Video to the Big Screen

By Rick Broida

Umax's \$399 scan converter, the Maxmedia TV/Pro II, can turn a conference-room television set into a giant-screen monitor that's perfect for multimedia presentations, software training, or even after-hours virtual trips with Flight Simulator.

About the size of a videocassette, the TV/Pro II intercepts the VGA signal from a desktop or notebook system and converts it to NTSC or PAL—but not SECAM—formats. The device requires no software drivers; the included cable connects it to the computer's VGA port, and a pass-through port allows simultaneous use of a monitor, even when the TV/Pro II is turned off.

There are three types of video-out connectors: composite, RGB, and Super VHS. The TV/Pro II allows you to send the PC's video signal to a TV or VCR as well. To use the TV/Pro II with a PAL TV or a Macintosh system, you'll need optional cabling and adapters.

The TV/Pro II supports 24-bit color and resolutions of 640-by-480 and 800-by-600. During evaluation, we found that to use the TV/Pro II at its highest resolution, the video adapter in the system needed to be set to a refresh rate of 60 Hz.

The unit breaks new ground by including a six-line memory buffer and special circuitry to reduce the flicker that usually results from converting VGA signals to the NTSC format. We found that the transferred images wouldn't suffice for, say, word processing, but they were just fine for presentations incorporating large text, graphics, and video.

An included hand-held remote control allows you to adjust image brightness, position, and size manually and then save these customized settings. We found that we could also freeze a frame

during an animated presentation, zoom in by a factor of 10, and pan around the screen.

We really liked the ability to toggle the unit's vertical-scaling settings, which compensates for the scan-line differences between NTSC and VGA. By doing so, the TV/Pro II enables the entire VGA image to fit on the TV screen without cutting off the top or bottom portion.



CONVERT-O-MATIC: The Maxmedia TV/Pro II converts your PC's VGA output into a television signal.

Umax's documentation is limited and fails to address several key issues, such as how to config-

ure a TV or VCR properly and whom to call if you need help. Fortunately, you probably won't need technical assistance, because the TV/Pro II is simple to use and operated flawlessly during our evaluation.

The TV/Pro II is an easy, effective way to move images from any computer to a TV screen or onto videotape.

Maxmedia TV/Pro II. List price: \$399. Requires: PC with VGA connector. Umax Technologies, Fremont, CA; 800-562-0311, 510-651-4000; <http://www.umax.com>. Circle 430 on reader service card.

SPEAKERS

Yamaha YST-M15 Speakers Produce Accurate And Affordable Sound

By Steve Buehler

Yamaha Corp. of America's \$89 YST-M15 multimedia speaker system borrows the best features of the company's hot-selling YST-M10 speakers and adds increased dynamic range, dual inputs, and a subwoofer-out jack. The result is

The 3-inch, 10-watt speaker has been moved higher in the triangular box for better near-field listening than the YST-M10 offered. In addition, the YST-M15 has input jacks for both a PC sound card and an external device. This allows for the use of multiple sources with no cable switching.



SOUNDS GOOD: The YST-M15 system contains innovative circuitry that monitors its output, resulting in accurate audio reproduction.

one of the best PC audio values available today.

Like the YST-M10 ("Speakers: The Sound and the Fury," January 9, 1996), the YST-M15 set uses Yamaha's innovative Active Servo technology. Active Servo tracks the movement of the speaker cone and corrects any deviation between the cone's movement and the input signal.

An output jack with a volume control knob works well for connecting a subwoofer. A headphone jack is located on the right speaker. This system can be purchased in a \$220 bundle with Yamaha's YST-MSW10 subwoofer.

Our ZD Labs measurements showed that the YST-M15 had a slightly better frequency re-

sponse than that of the YST-M10; the big difference was improved response in the low end of the sound spectrum. We measured a frequency response of 101 to 20,000 Hz, +/-6 dB. When attached to the YST-MSW10 subwoofer, the frequency response improved to 39 to 20,000 Hz, which is very respectable for multimedia use. The speaker's maximum output was over 100 dB, and total harmonic distortion was a very good 0.28 percent.

Throughout testing, the Yamaha speakers produced clear and accurate audio reproduction, but the sound often lacked depth. At low volumes, the sound was excellent. Higher volumes brought on some minor clipping and distortion, especially in the midrange tones.

These are above-average multimedia speakers at a reasonable price; the YST-MSW10 subwoofer is another excellent choice.

Yamaha YST-M15 Speakers. Estimated street price: \$89. Requires: Audio output. Yamaha Corp. of America, Buena Park, CA; 800-823-6414, ext. 399; 714-522-9011; <http://www.yamaha.com>. Circle 428 on reader service card.

Microsoft

WHEN DO YOU WANT TO USE TODAY?



Will the Internet bring an end to business computing as we know it?

Not at all. It will simply knock down the walls between people, between departments — even between companies. The promise of the Internet, while intoxicating to some, is threatening to others. Because along with the unlimited access and opportunity it provides, comes the need for new strategies and new technologies. Happily, those who've begun the transition to client-server already have much of what they need in place. And to help businesses incorporate the Internet and intranet into their operations, Microsoft is integrating the necessary technology into many of its products — from desktop to server to tools.

For example, it's never been easier to connect desktops to the Internet. That's because both Microsoft® Windows® 95 and Windows NT® Workstation operating systems have all the “plumbing” built right in. Viewing content is just as effortless. With Microsoft Internet Explorer, users can browse the Internet (or internal corporate webs) whether they're working on the Windows platform or on the Macintosh™.

Of course, making web content easy to view is only the beginning. To be useful to organizations, content has to be easy to create, too. Which is why the latest generation of Microsoft Office applications, along with Internet Assistants, allow users to develop web content without programming. They simply save their work as HTML, the way they would any other document. Such ease-of-use also extends to the newest member of the Microsoft Office family, the Microsoft FrontPage™ web authoring tool, which lets users create and manage entire web sites, even if they've never so much as programmed a VCR.

The Internet is very much a part of our BackOffice™ family, too. With Microsoft Internet Information Server, we've extended the performance of Windows NT Server to make the ideal Internet platform. Now every organization can host and manage web content and applications securely and reliably. And, with Microsoft Exchange Server, secure and reliable e-mail is also a reality, whether it's traveling over the Internet or within your organization.

The truly interactive web page has arrived as well...and with it, full motion video, audio and moving text. Advances made possible by technologies like ActiveX™ controls, which let developers embed sound, video, and applications without having to learn new languages.

Yes, the walls are coming down, but it's not the end of business computing. Just the next, most practical evolution. To learn more, or to download our free Internet products, visit <http://www.microsoft.com/internet/go11/>

COMMUNICATIONS

Dispatch: The MCI Mail Front End You've Been Waiting For

By Edward Mendelson

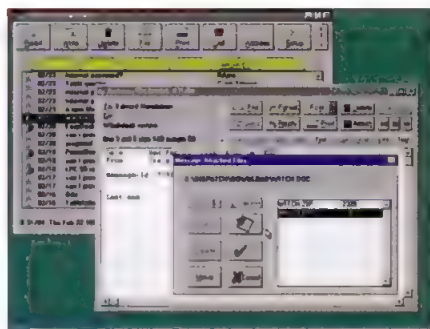
You can use any of half a dozen programs to access MCI Mail, but the one you want is Dispatch for MCI Mail, Version 2.0, from Common Sense Solutions. This \$59.95 utility, which runs under Windows 3.1, Windows 95, and Windows NT, combines an efficient interface with complete MCI Mail support.

Dispatch's simple interface is controlled entirely by either shortcut keys or clearly labeled buttons. When you compose a message, adding an address from the address book (which supports all address formats used by MCI Mail) is just two keystrokes away. Adding to the address book is effortless: The program can automatically grab addresses from incoming messages, or you can

highlight an address while reading a message and copy it to the address book.

Dispatch uses nested folders to store the messages you want to preserve. An ingenious option automatically files messages in specific subfolders if they come from specified recipients or have user-specified keywords in their subject fields.

Dispatch handles file attachments elegantly and efficiently, adding the file compression and viewing functionality that have been missing from other MCI Mail programs. If an attachment is in a file type registered in Windows, such as an Excel spreadsheet, clicking a button automatically launches the attachment in Excel. When Dispatch detects an attached .ZIP or uuencoded file,



ATTACHMENTS: Dispatch decodes .ZIP and uuencoded files and lets you launch them from within the program.

the decoded files are added to the list of attachments and can be launched in the same way.

Dispatch automates tasks that would normally require extensive manual labor in other programs. If you want to check MCI Mail's online list of subscribers, just choose the Terminal Mode option; the program logs on and leaves you at the MCI Mail command prompt. After you find the address you want, you highlight the line in the terminal window

and press a button; the address is then added to the address book.

The only drawback is the software's search mechanism. You can search within a message but not for a particular message—a real limitation if you have a lot of old messages.

Dispatch does everything the DOS-based mail front end, MCI Express, does and

much more. Dispatch can even import all the stored messages and folders from MCI Express.

If you have been waiting for the ideal MCI Mail front end, your wait is over.

Dispatch for MCI Mail, Version 2.0. List price: \$59.95. Requires: 4MB RAM, 10MB hard disk space, Microsoft Windows 3.1, Windows 95, Windows NT. Common Sense Solutions, New Windsor, IL; 309-667-2772; MCI Mail: 504-8687. *Circle 402 on reader service card.*

ACCOUNTING

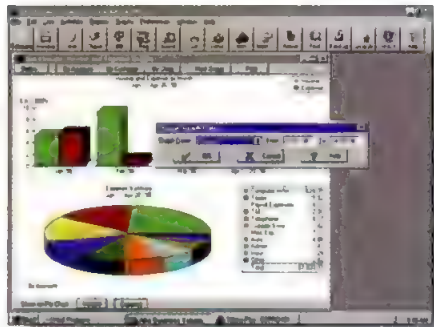
QuickBooks Pro 4.0 Integrates Time-Billing and Cost Estimates

By Theresa W. Carey

Owners of businesses that bill by the hour have had few options available for taking care of their accounting needs without either spending a small fortune or cobbling together billing and accounting packages. Intuit remedies this quandary with its \$189 QuickBooks Pro 4.0 for Windows, a low-end package that not only handles time- and project-billing for service-based businesses but also adds greater functionality and integration with Intuit's TurboTax and World Wide Web site.

The QuickBooks Pro CD-ROM (the package also includes disks) contains tips and tricks for using the program in specific industries and an EasyStep interview to help you open a new set of books. Similar to the interview in TurboTax, the EasyStep interview

helps you configure the program for your business. You start by choosing from among 19 industry classifications. Then you select



HOW'S BUSINESS? You can create custom graphs and reports in QuickBooks Pro to display income or expense categories.

your chart of accounts and classify the type of tax form you use before setting up inventory items.

At this time, QuickBooks Pro is the only mainstream small-

business accounting program available that integrates time-tracking and billing. These features will suit a small service-based business, though they're probably not extensive enough for a busy law office—mainly because the program does not support multiple users.

QuickBooks Pro contains a job-costing module that lets you estimate a project's expenses and then convert those estimates into an invoice. You can enter the time spent on projects either by employee or by project in a weekly time card. Unfortunately, the reports available are rather rudimentary. You can create a report showing the number of unbilled hours entered, for example, but you can't see the dollar value of the unbilled time.

In Version 4.0, Intuit made several much-needed improvements to QuickBooks Pro's basic ac-

counting functions. The two-step process for receiving a payment and depositing the check, for example, has been streamlined. In addition, the contact management features have been improved, and you can now both add free-form notes to your customer records and create a file to be used for a mail-merge. And the new To Do list lets you add your own items as well as have QuickBooks Pro automatically generate a Reminders list for checks to print, bills to pay, and so on.

With Version 4.0, QuickBooks Pro remains a top contender in the small-business accounting market. And along the way, it eases those time and billing chores for service-based companies.

QuickBooks Pro 4.0 for Windows. Estimated street price: \$189. Requires: 4MB RAM (8MB recommended), 21MB hard disk space, Microsoft Windows 3.1 or Windows 95. Intuit Inc., Mountain View, CA; 800-781-6999; <http://www.intuit.com>. *Circle 403 on reader service card.*

It's your business. Who would you trust to back you up?



**The award winning
HP Colorado T1000e
Tape Drive.**

- Affordable
- One button backup
- Box to backup in minutes



Nowdays, businesses of all sizes, everywhere, rely on the same precious commodity. Information.

Customer records, inventory, tax information, are the lifeblood of your business. And, while most data is safe, a computer virus, human error or other catastrophic event, and your data could vanish into thin air.

That's why it's so essential to back up.



The easiest and most reliable way to protect your data comes from the company that everyone trusts. Hewlett-Packard, the world leader in tape backup. The affordable

HP Colorado T1000 stores up to 800 MB* using new TRAVAN™ technology. It includes true Windows® 95 software. One button backup and unattended operation make it a snap.

Other Hewlett Packard tape drives range from 350 MB* up to 24 GB*. So whether you're backing up your PC or your network, HP has a solution for all of your storage and backup needs.

Now there's no excuse to leave your data unprotected. Your business depends on it, and you can depend on Hewlett-Packard. Visit your dealer, or call 1-800-826-4111 ext. 1296 for more information.

*Maximum capacity using 2:1 data compression.

CIRCLE 073 ON READER SERVICE CARD

MUSIC

Jammer Pro and Your PC Make Beautiful Music Together

By Craig Stinson

Composing music may be more of an art than a science, but Jammer Professional, from Soundtrek, demonstrates that a computer algorithm can produce a stylish riff as readily as an amortization schedule or a video game. With the \$199 Jammer Pro, you can spin out rhythm, harmony, and melodic stylings in any of 200 band and 50 drum variations as easily as clicking a button.

In a typical Jammer Pro session, you might begin by laying down a chord progression; chord changes are allowed on eighth-note boundaries. Working section by section through a song, you proceed by specifying band and drum styles. We chose one style for an introduction, another style for the next 16 measures, and yet another for an end-of-chorus break.

Each time you hit Jammer Pro's Compose button, the program uses the stylistic parameters that you set and probability weights to improvise the music. If you like what you get, you can keep it. If you don't like the results, try again and you'll get something completely different—but still within the chosen style constraints.

If you like only some of what Jammer Pro gives you, you can save it and let the program keep working on the rest. During evaluation, we created an intro that contained a great saxophone solo (which we kept) and had Jammer Pro redo the other parts.

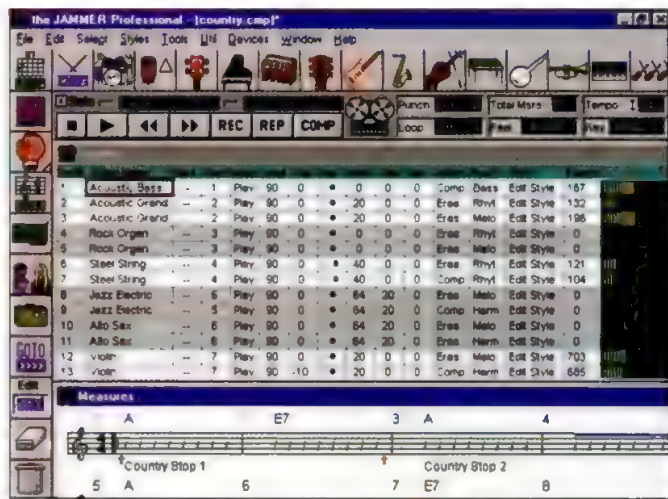
Jammer Pro and the \$89 Songmaker are identical, except that the former lets you edit a song's style definitions. Both versions are extraordinarily versatile, however. Band styles encompass bluegrass, blues, country, pop, funk, jazz, Latin, and rock; classical and waltz styles are also available. You can set all styles to slow

or upbeat tempos, and in variants for intros, grooves, breaks, stops, endings, and more.

Jammer Pro's chord editor lets you specify about 60 different chords, plus inversions, on any root. A right-click in the editor lets you hear the chord before committing to it. If you don't know which chords to use, the program will improvise.

Jammer Pro's other settings let you select virtually any quarter-note- or eighth-note-based time signature you can imagine, and any of seven modes (including major and minor).

Jammer Pro is not a sequencer, and it won't generate melodic notation. But within these limitations, Jammer Pro produces surprisingly lively and professional music. You can even use the program as a starting point for song



MAESTRO: Jammer Professional improvises music in 200 styles and lets you edit the style definitions.

creation, to create background tracks, or for any other situation in which you need professional-sounding music in a hurry.

Jammer Professional won't generate inspired melody or write the showstopping ballad. But for a variety of musical tasks at more terrestrial levels, it hits the right note.

Jammer Professional. List price: \$199. Requires: 4MB RAM, 7MB hard disk space, Microsoft Windows 3.1 or later or Windows 95, Windows-compatible sound card or MIDI interface. Soundtrek, Duluth, GA; 800-778-6859, 770-623-1338; <http://www.soundtrack.com>. Circle 401 on reader service card.

HARD DISKS

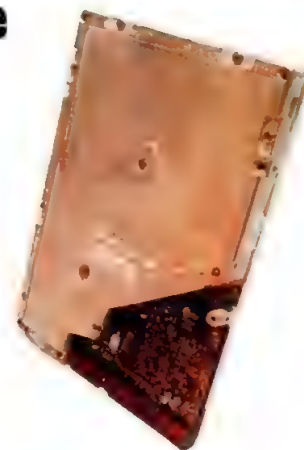
Quantum's Bigfoot: A Monster of A Hard Disk Value

By Alfred Poor

The biggest news in the hard disk business of late has been the Bigfoot, a 5.25-inch-wide drive that can hold 1.2GB or 2.5GB and sells for \$225 or \$370, respectively.

At a time when the trend is toward smaller hard disks, Quantum Corp. thinks big. But make no mistake; this is not like the old full-height drives of yore that filled entire drive bays. The Bigfoot is just three-quarters of an inch thick.

The drive's slim profile is made possible by ultrasmall on-board circuitry that fits within a triangular corner of the drive's housing. The Bigfoot also benefits from technology used in smaller drives, such as the thin-film heads developed for Quantum's Fireball drives. Performance is aided by its ATA-2 PIO Mode 4 and



WIDE LOAD: The Bigfoot can hold either 1.2GB or 2.5GB of data.

DMA Mode 2 support (which have a combined rated data-transfer rate of 16.6 MBps).

Because the disk spins at 3,600 rpm, the Bigfoot's specifications are less than you'd expect from a top-of-the-line drive. For exam-

ple, it has only a 15-ms seek rating. In the course of our Disk WinMark 96 tests, it produced a data-throughput rate of 813 KBps—considerably slower than the 1,170 KBps posted by a Fireball drive of approximately the same capacity.

On the other hand, the long tracks of the 5.25-inch platters mean that the drive heads don't have to move much on long sequential read and write operations. Working with 2K records, the Bigfoot managed 4,670 KBps on writes and 3,930 KBps for reads, compared with 4,610 KBps and 3,620 KBps, respectively, for the Fireball drive.

The best part is the price: The Bigfoot undercuts the next-best drive by about a dime a megabyte—which adds up to a giant value.

Bigfoot. List price: 1.2GB, \$225; 2.5GB, \$370. Requires: Enhanced IDE or Fast ATA interface. Quantum Corp., Milpitas, CA; 800-624-5545, 408-894-4000; <http://www.quantum.com>. Circle 404 on reader service card.

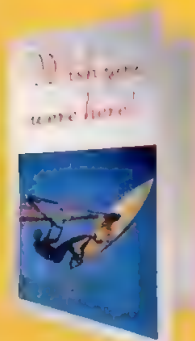


*Take it with you.
Everywhere.*

Kodak digital technology that fits in your pocket. Pretty liberating, huh? It's the newest in our award-winning line of digital cameras—the *Kodak Digital Science™* DC20 camera. Download, enhance, manipulate and e-mail images on your PC or Macintosh. (Exclusive software is included on CD.) No film processing. No scanning. Translation: No waiting. So anyone can have fun sharing Kodak moments *in* moments. Once they reach the ground.



*E-mail it to your
friends.*



*Make your friends
jealous.*



**ANY \$350 CAMERA CAN
CAPTURE THIS PICTURE.
ONLY ONE CAN SET IT FREE.**



*Make your words
come to life.*



*Show them what
you did today.*



THE DC20 DIGITAL CAMERA



Stretch yourself.

To find out more about the DC20 digital camera and other *Kodak Digital Science* products, visit us at

Kodak *ds*
digital science™

<http://www.kodak.com/> or call 1-800-508-1531 in the U.S.,
1-800-465-6325 in Canada for the dealer nearest you.

TAKE PICTURES. FURTHER
CIRCLE 334 ON READER SERVICE CARD

Kodak, Digital Science and the ds monogram symbol are trademarks of Eastman Kodak Company. © Eastman Kodak Company 1996

How to push the envelope

and still



PENTIUM® PROCESSOR:

100 MHz, 120 MHz,
and 133 MHz

SYSTEM MEMORY:

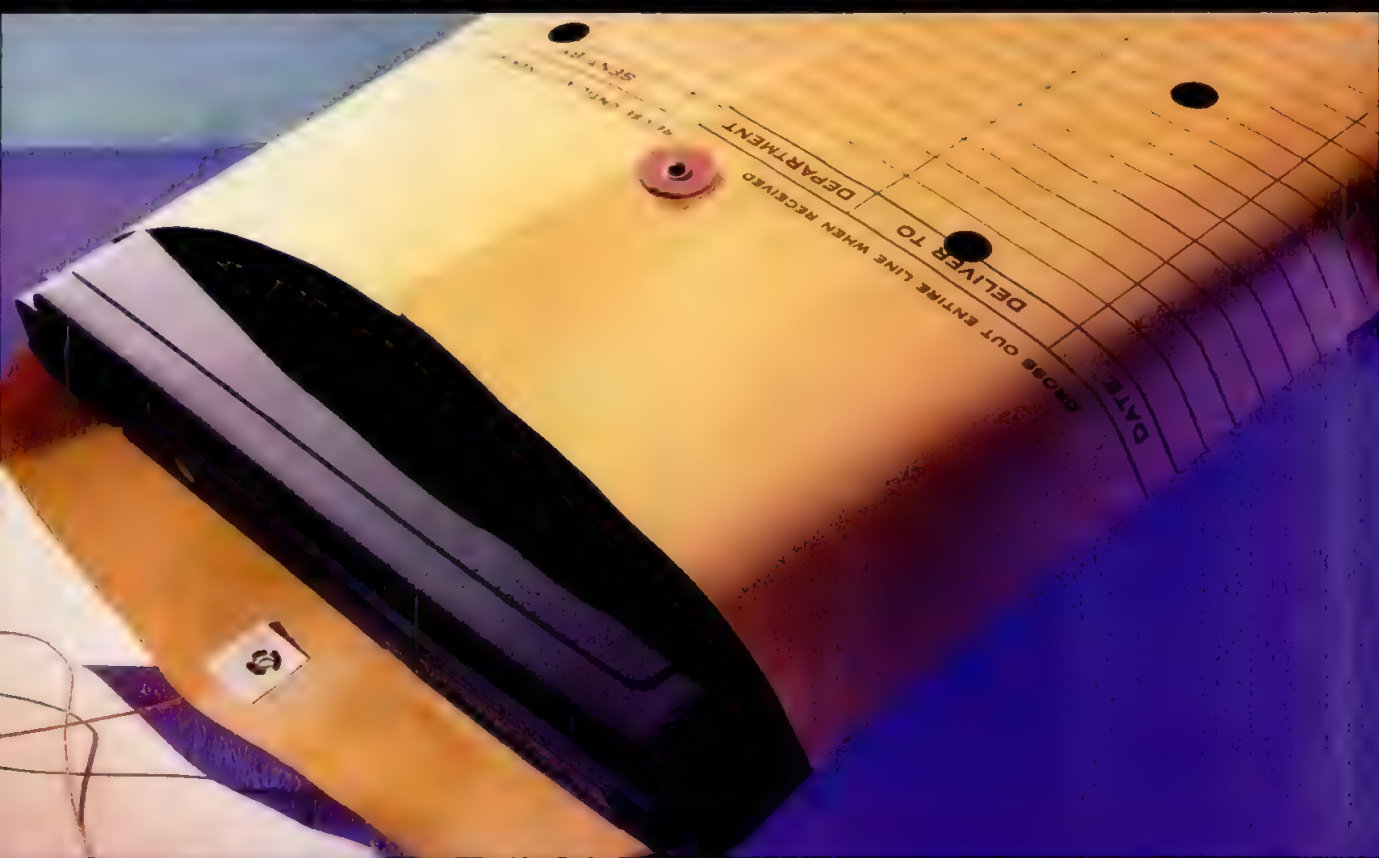
8 MB to 40 MB RAM

HARD DRIVE:

HDE: 810 MB, 1.08 GB,
or 1.35 GB user-removable

FEATURES:

VGA and SVGA TFT
LCD screens with local
bus graphics and BitBLT
engine, full array of standard
ports, integrated IrDA
standard infrared.



fit inside it.

**THE NEW 133 MHz PENTIUM® PROCESSOR-POWERED DIGITAL HiNOTE ULTRA™ II.
ABOUT FOUR POUNDS LIGHT AND ONE INCH THIN.**

Make no mistake – Digital PC technology knows no bounds. Our newest notebook, however, knows the bounds of 1.1 inch by 8.5 inches by 11 inches.

It's the new Digital HiNote Ultra™ II. Slim, sleek and stuffed to the gills with every power-

user goodie imaginable – including the rip-roaring 133 MHz Pentium® processor. Proving yet again that if you want to be on the cutting edge, it helps to be razor thin.

Call 1-800-DIGITAL and press 3 for your nearest reseller or visit our Web site at www.pc.digital.com.



digital
PC

3-D MODELING SOFTWARE

SolidWorks 95: Visualization in a Box

By Jeff Prosine

Visualization is a critical tool for the design engineer. Nowadays, visualization involves computer-based solid models depicting complex parts and assemblies. SolidWorks 95, a 32-bit parametric 3-D design and modeling package, delivers visualization in a box: Sketch a design on the computer screen and the program will quickly shape it into a beautifully shaded model, help you generate finished drawings, perform interference checks, and more. At \$3,995, SolidWorks 95 is not for every desktop, but it delivers some sophisticated technical features rarely found in native Windows 95 applications.

SolidWorks 95 makes 3-D modeling an integral part of the design process. To build a design, you begin by sketching the part or parts that make up the model. Parts are formed from "features," which come in three varieties: bosses, which add material; cuts, which remove material; and holes, which create holes. Features are sketched in 2-D and then extruded, revolved, lofted, or swept along a path to generate 3-D objects. A complete inventory of the features that make up a part appears in the Feature Manager pane positioned to the left of the main drawing and viewing area, making it easy to select a particular feature or pop up a window that lets you edit the feature's properties.

CARVING A NICHE

After a part's basic geometry is defined, you can add chamfers, fillets, and other features. On our tests, SolidWorks 95 proved adept at filleting complex edges. The powerful Shell command takes an existing solid and generates a hollow shell of a specified thickness, which makes it ideal for modeling cast or injection-molded parts.

Once a part is created, a few button-clicks generate a detail

drawing containing the standard three orthogonal views of the part. On command, SolidWorks 95 will add dimensions to the views. You'll invariably have to

BUILDING BLOCKS: An Explorer-like pane displays all the elements that make up your design.

NUMBER CRUNCHER: SolidWorks 95 calculates several properties of parts, including center of mass, surface area, and volume.

SOLID RESULTS: Parts like this one can be created in minutes with SolidWorks 95 by combining bosses, cuts, fillets, and other features to form a finished solid.

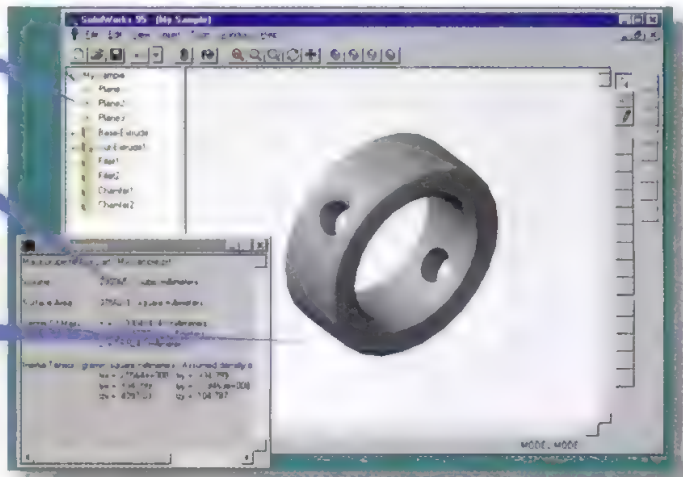
do some editing to make the dimensions presentable, but it's fair to say that the software does at least half the work. Commands are also provided for adding detailed auxiliaries, projections, sections, and views. Drawings may span multiple sheets, and tabbed dividers make it easy to switch among sheets.

Part models can be combined to create assemblies depicting the final product. Checking for interferences between parts is no more difficult than selecting a command from a menu. If you prefer, you can check for malfitting assemblies on the fly by enabling automatic interference detection. SolidWorks 95 will compute center of mass, volume, and other mass properties for individual parts, but not for part assemblies.

SolidWorks 95 will import .DXF and .DWG (AutoCAD) files into its own drawings and create 3-D models from IGES (Initial Graphics Exchange Specification) and Parasolid files. It will also save parts in the IGES, Parasolid, and STL formats and drawings in the .DXF and .DWG formats. One warning: The release notes caution that "some IGES files will not import into SolidWorks 95."

Many 3-D modeling packages

look good on paper but prove unwieldy and difficult to use in practice. Something as simple as picking an edge can be a trying experience because it may be hid-



den behind a face or obscured by another edge. SolidWorks 95 gets an A- for the design of its user interface, which is exceptionally well thought out and almost as well executed. Buttons on a toolbar let you quickly toggle hidden lines on or off, display hidden lines in gray, or switch to a full-blown shaded rendering. You can edit a part in any of these modes. Right-click context menus are used extensively.

The only shortcoming is the program's dialog-box design. The dialog boxes are too crowded, use nonstandard fonts, and include an odd mixture of spin-button controls and jury-rigged scroll bars for entering numerical values. None of these flaws are fatal, but they certainly mar an otherwise polished product.

During testing, we experienced frequent crashes, some of which were caused by actions as simple as attempting to close an open document. Until the bugs are worked out of the code, save your work often.

ON THE SURFACE

SolidWorks 95's chief weakness as a solid modeler is its lack of sup-

port for contoured surfaces. You can generate nontrivial surfaces by sweeping planar sections along 3-D paths and by lofting, but you can't, for example, create Bezier or Coons patch surfaces. Some of SolidWorks 95's gee-whiz features include Design Tables that allow dimensions to be tied to values in an Excel spreadsheet, a built-in

programming language called SolidBasic, split-window views of documents implemented in an MDI (multiple-document interface) framework, and toolbars that can be floated and docked. The package also includes full-blown OLE container and server support and exposes its capabilities to other programs through OLE Automation.

Like the first release of any major software package, SolidWorks 95 has a few rough edges. But all in all, SolidWorks 95 is a capable tool for developing and analyzing mechanical designs, especially when you consider that many other solid modelers still require a graphics workstation costing \$15,000 or more. SolidWorks 95 demonstrates just how far the PC has come in recent years.

SolidWorks 95. List price: \$3,995. Requires: 32MB RAM (48MB recommended), 32MB hard disk space, Pentium or Alpha processor, Microsoft Windows 95 or Windows NT 3.51. SolidWorks Corp., Concord, MA; 800-693-9000, 508-371-2910; fax, 508-371-7303. Circle 405 on reader service card.

[ANOTHER OF THOSE INCREDIBLY-HARD-TO-FIND
CUSTOMER COMPLAINTS ABOUT ADI MONITORS.]

"They come in those
yucky brown boxes."



Okay, so maybe Sarah here isn't too fond of our cardboard package. But, hey, why fret over the box? It's what's inside that counts, right? And what's inside is a monitor so reliable, so easy to set up and so full-featured, that there's really not much left to complain about. The way we see it, if the color of the box is your only beef, then you must be pretty happy with our monitor. How can a line of monitors be so worry-free? To find out, call us. 1-800-228-0530.



Right Track.

Make better decisions at every turn with SureTrak Project Manager 1.5.

Write your own road map to on-time projects. The more obstacles your project runs into, the more you need SureTrak. Get a better look at where you're going and where you've been. Beat every deadline with the unique Progress Spotlight™ graphical to-do list. Compare progress with the original schedule and see the effect of surprise

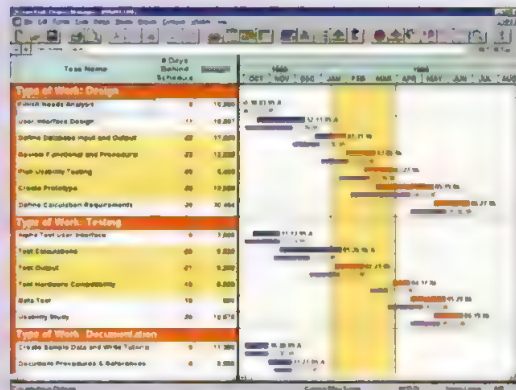
events, shifting priorities and changing scope. And SureTrak gives you the control you need to keep your project on course.

Travel the straight path: just \$299. SureTrak has the power you need to manage multiple projects. You can plan and update individually or in a group, so each project gets the proper focus from you and management.

Call 1-800-423-0245 now. Get a FREE SureTrak 1.5 demo disk and a copy of *Making It Happen*, a common sense guide to project management.

PRIMAVERA
How the world says project management

Internet: sales@primavera.com
<http://www.primavera.com>
CIRCLE 148 ON READER SERVICE CARD

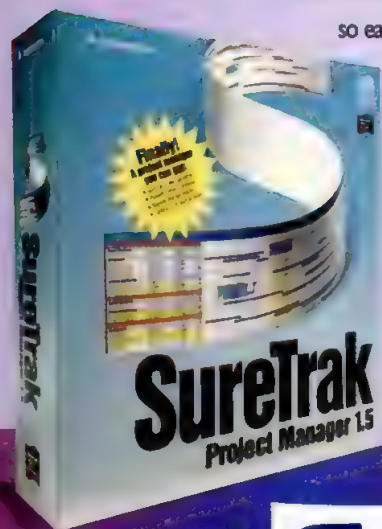


EGGHEAD

MICRO CENTER
THE COMPUTER EXPERTS STORE



Two Bala Plaza • Bala Cynwyd, PA 19004-1586 • USA
(610) 667-9600 • (800) 423-0245 • FAX: (610) 667-7894
Copyright © 1996 Primavera Systems, Inc.
SureTrak Project Manager is a registered trademark
and Progress Spotlight is a trademark of Primavera
Systems, Inc. Third-party names and trademarks are the
property of their respective holders.



SureTrak

First Looks

SCANNING

IrisPen Executive Reads Between the Lines

By Brian Nadel

Like the original IrisPen (First Looks, November 8, 1994), the IrisPen Executive, from Image Recognition Integrated Systems, is an innovative line scanner. The \$399 Executive edition adds an advanced speech-synthesis function that can capture and read the material to you as well as the ability to read bar codes, white-on-black text, and handwritten numerals.

The marker-size wand connects to your PC's parallel port and draws power either from the keyboard port or from four AAA batteries—for use with a notebook PC. Just swipe the text with the wand and the IrisPen pulls in characters a line at a time. The included proprietary optical character recognition (OCR) software then converts the image into text. It takes a little practice and manual dexterity to line up the pen correctly over the type, but we quickly became adept at this and were able to scan about as fast as we could type.

The IrisPen can handle text from 8-point to 22-point size and even correctly converted dropout type and text on colored backgrounds. We had the best results with black text up to 14-point size on a white background.

The IrisPen generally converted text correctly. At times, it produced bizarre results. When we scanned in the words "sex offender" from *The New York Times*, the system yielded "ex off end." To improve the results, you can train the system to recognize the particular type that you read most often.

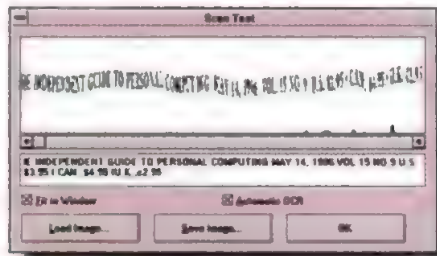
Once you scan in a string of text, the IrisPen can read the passage in your choice of 15 languages, ranging from Brazilian to Ukrainian. With a DX4/75 PC, there was a slight delay between the time the IrisPen captured the text and the time it read the text

calm and deliberate manner. If the IrisPen doesn't find a match in its dictionary, it spells out the word. The IrisPen can read spreadsheets or columnar material, but we found that because there was no dictionary to match against, the results were not as good as with text recognition.

The IrisPen is in its element scanning newspaper and magazine body type, letters, and even advertisements, and it can be a valuable proofreader.

For nontext sections, the IrisPen can capture a bitmap to transfer a mathematical formula or a section of music score; there's also an accurate bar code reader.

Users of the original IrisPen



LISTEN UP: The IrisPen Executive captures text a line at a time and then reads it to you in one of 15 languages.

aloud. This wait was virtually eliminated on a Pentium/133 test-bed.

A female voice reads the words the IrisPen recognizes in a

can upgrade the software to Version 3.0, which incorporates all of the new features of the Executive edition, for \$99. A niche product that is probably not at the top of most users' wish lists, the IrisPen Executive is nevertheless essential equipment for those who want to grab a line from a newspaper or textbook—and have it read to them.

IrisPen Executive. List price: \$399. Requires: 4MB RAM (8MB recommended), 5MB hard disk space, sound card, Microsoft Windows 3.1 or later or Windows 95. Image Recognition Integrated Systems, Boca Raton, FL; 800-447-4744, 407-395-7831; <http://www.irisusa.com>. Circle 426 on reader service card.

MONITORS

Sceptre Slims Down the LCD Monitor

By Alfred Poor

At \$1,999, the 12-inch active-matrix Sceptre CD-1112T LCD monitor, from Sceptre Technologies, still costs considerably more than a CRT monitor, but its small size, high resolution, and ease of use more than make up for its hefty price tag.

The futuristic design of the CD-1112T includes an adjustable base and a separate display panel that you can slide up and down to adjust the height. Unlike traditional monitors, which can weigh upward of 50 pounds, the 7-pound CD-1112T is so light that you can even hang the screen on the wall. The unit is less than 10 inches deep.

The 12.1-inch-diagonal active-matrix LCD panel is capable of displaying 256 simultaneous colors (out of a palette of 262,000 colors) and has an 800-by-600-pixel resolution. We tested the CD-1112T with an included proprietary PCI graphics adapter, but Sceptre also sells a model that plugs into a standard VGA connector. The PCI card also supplies power to the display.

The display worked well on tests with Windows 95. Images with a resolution of 800 by 600 pixels fill the panel from edge to edge. When we set the display to

panel's angle a bit to get the best-quality image. We noticed that the display occasionally had problems with uneven back-lighting.

The CD-1112T has some strong points: small size, high resolution, ease of use, low power consumption, and little or no emission of low-frequency electromagnetic radiation. On the other hand, it is limited by the proprietary graphics adapter and relatively high cost compared with CRT monitor displays. Compared with many other desktop LCDs, the CD-1112T is actually a bargain.

This type of cutting-edge display will appeal to the user whose budget is a little bigger than the amount of free desktop space. LCD monitors remain a niche product, but the flat-panel display is clearly the desktop monitor of the future.

Sceptre CD-1112T LCD. List price: \$1,999. Requires: PC with PCI slot. Sceptre Technologies Inc., City of Industry, CA; 800-788-2878, 818-369-3698; fax, 818-369-3488. Circle 427 on reader service card.



DOWN-SIZED DISPLAY: Sceptre's CD-1112T LCD panel is so svelte that you can tuck it in a briefcase or hang it on a wall.

a 640-by-480 resolution, the CD-1112T displayed images in the center of the screen at their actual resolution.

About the only adjustment you need to make is to set the



Nothing is more uncomfortable than discovering

You buy a server, your company grows; you buy another server, your company grows. It's time to break this vicious cycle. Introducing the Sun™ Ultra™ Enterprise™ Servers.

The mainframe-caliber servers designed to grow as your company grows—without the usual cramps or compromises. Whatever your business needs, whether it's multiple-terabyte





your server is too small.

data warehouses or the ability to support thousands of users, Sun delivers. And best of all, you'll never wake up cramped in to a corner. Modular, scalable design lets you add CPUs and pump up I/O bandwidth as needed. Redundant, hot-swappable components, along with round-the-clock service and support, deliver the reliability to keep your mission-critical applications up and running.

All of which adds up to enough network computing power to cover your entire business, no matter how quickly it grows. Sun Ultra Enterprise Servers. They're every reason you bought a mainframe, and every reason you didn't.

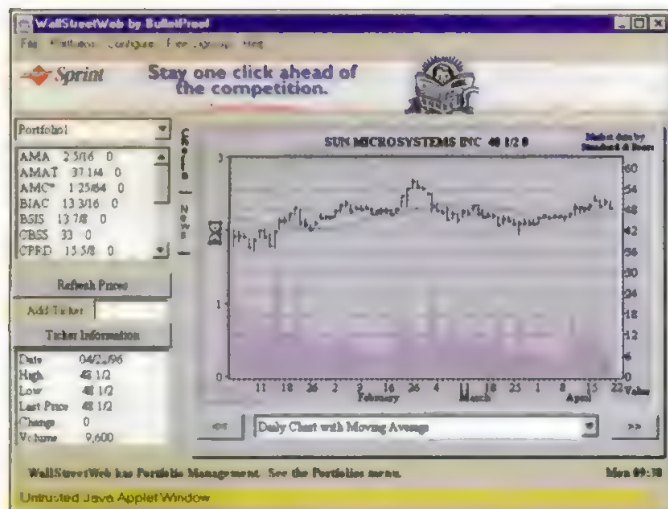
To learn more, contact Sun at

<http://www.sun.com> or call us

at 1-800-786-0785, Ext. 390.



First Looks



WORLD WIDE WEB SITES

Web-Wise Investment Wisdom

By Sebastian Rupley

At tax time, when you're assessing the performance of your portfolio, do you ever consider the cost of the information that guided your investments? Investment software products, online services, brokerages, and financial periodicals now face real threats from free and low-cost alternatives on the World Wide Web.

Take company research reports, for example. Brokerages such as Charles Schwab (<http://www.schwab.com>) typically rake in about \$5 for each report—as do major online services, such as Reuters Money Network—but you can get 25 of them a month from MarketEdge's Web financial service, which costs \$7.95 a month. Data services for charting software, such as Dial Data and Telerate, tend to charge investors \$50 or more per month for securities-pricing data, but WallStreetWeb offers similar data for under \$10 a month.

Here we review four of the most sophisticated wellsprings of investment information on the Web. Only stock tips at cocktail parties come cheaper.

MARKETEDGE

Thomson Financial Services, a financial-information provider

to big-time investment firms, offers a deep reservoir of sophisticated market and investment information, located at <http://www.marketedge.com>. MarketEdge's price of \$7.95 per month, with the first month free, is far lower than what brokerages charge for similar services.

For example, MarketEdge's monthly fee entitles you to 25 company research reports and 25 mutual-fund reports, 50 historical price charts (charting services typically cost about \$20 to \$50 a month), five industry reports, and unlimited quotes with a 20-minute delay.

The extras are what really make MarketEdge stand out. For example, its company-screening application lets you build stock-market queries based on multiple, sophisticated criteria such as the degree of insider trading, growth rates, and so on.

Bulletin-board access, bond-tracking data, and many other extras make this low-priced service a great find for those who don't want to rack up big investment-hunting bills each month.

WALLSTREETWEB

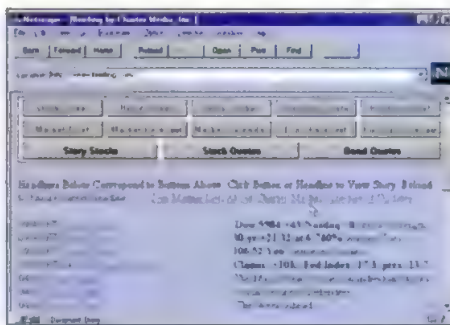
BulletProof Corp.'s WallStreetWeb is a Java application designed to provide market-charting functionality rivaling that of standalone

TICKER: WallStreetWeb lets you create a custom portfolio, receive instant quotes, and chart performance over time.

applications such as Metastock, Supercharts, and Windows On Wall Street. It's one of the slickest examples of how a low-cost Web applet can compete directly with retail software products.

WallStreetWeb costs \$9.95 per month; the basic service includes quotes and trading statistics delayed by 15 minutes, charts, stock searches, and portfolio management. BulletProof also has sophisticated new features in the works, such as option- and commodity-trading statistics and news feeds.

The charting features within WallStreetWeb aren't yet quite as sophisticated as those you'll find in technical-analysis products such as Metastock, but you get nearly all of the most widely used technical tools, including stochastics and moving averages. Several examples of WallStreetWeb in



NEWS YOU CAN USE: Briefing is a gold mine of up-to-the-minute financial news and authoritative stock picks and pans.

action are available at <http://www.bulletproof.com>. BulletProof's home page also includes links to many other financial services it provides, as well as links to interesting third-party financial services.

THE FINANCIAL CENTER

Located at <http://www.tfc.com>, The Financial Center includes one of the richest collections of free stock advice from some of the nation's top money managers and analysts, offering bond, mutual-fund, and stock selections. The core attraction is the Market Mavens News and Views feature, which is updat-

ed weekly and features industry analyses and securities picks from Wall Street luminaries.

Unlike some other sites that collect recommendations from mediocre financial newsletters and fail to follow up on the performance of the model portfolios, The Financial Center features top-notch picks and pans and reports on their results. For a sample of some of the top performers selected by analysts at The Financial Center, take a look at J. Michael Pinson's 1995 collection of selections (<http://www.tfc.com/pinson/index.html>).

The Financial Center offers many other free financial services and includes links to some useful extras, such as the Financial Center bookstore.

BRIEFING

Many standalone investment software products, such as Reuters Money Network and Windows on Wall Street, provide a mix of

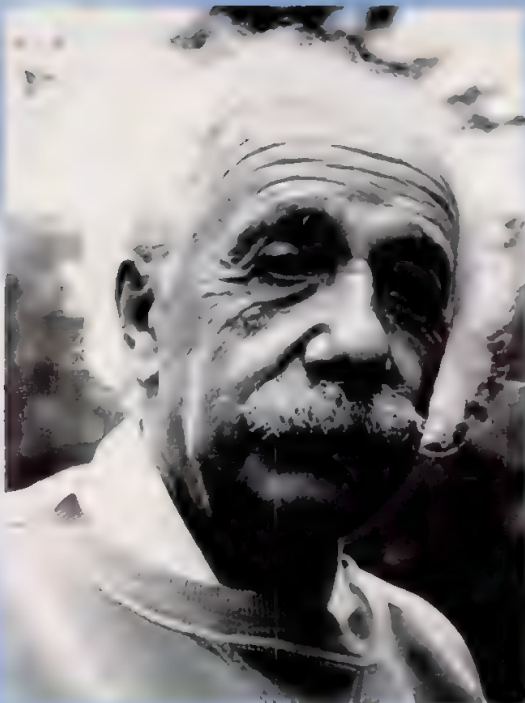
daily news and market updates along with the standard fare of quotes and charts. Charter Media's Briefing, located at <http://www.briefing.com>, delivers investors a richer daily news feed than any of these retail software products.

The daily reports are designed to mirror the ones provided to

Wall Street investors

by news organizations such as Bloomberg, typically at a cost of \$200 to \$300 a month.

Briefing is updated throughout the trading day and offers daily news updates on everything from how the dollar is doing to political news affecting the markets to updates on individual company earnings minutes after they're reported. Whether you want to sell one of your mutual funds before interest rates rise or you're a serious day trader on the lookout for economic forces that may influence your trades, this site is a free gold mine of daily bulletins.



ABC GRAPHICS SUITE. BECAUSE IN TODAY'S BUSINESS WORLD, YOU'RE EXPECTED TO BE BOTH.



ONLY \$149.95*



To stay ahead, you need both the brilliant logic of Einstein, and the bold creativity of Van Gogh. And the right tools to keep up—**ABC Graphics Suite**. Three powerful programs in one package that let you diagram one minute, illustrate or image edit the next.

Microsoft® Office™ compatible and designed for Win NT and Win 95, ABC Graphics Suite gives you true 32-bit multithreading technology, plus the ease and speed of a drag and drop environment.

Powerful. Versatile. Indispensable. The software that brings the art and science of business together. **ABC Graphics Suite.**

Download our free Internet Graphics Pack and explore the details of ABC Graphics Suite:
www.micrografx.com

Use our automated fax back system or speak with a Micrografx representative:
1-800-562-8327



MICROGRAFX

ABC FLOWCHARTER® 6.0

- Simple to sophisticated business diagramming
- Over 2,000 diagramming symbols for increased versatility
- Intelligent line routing and automatic line crossovers for better readability

MICROGRAFX DESIGNER™ 6.0

- Precision drawing for illustration and graphics design
- Over 32,000 layers for unlimited graphics flexibility
- EPS output for better color separations

PICTURE PUBLISHER® 6.0

- Fast and powerful photo retouching and image editing
- Infinite Undo™ for unparalleled creative freedom
- Object Layers™ for increased productivity

ALSO INCLUDED:

- Instant 3D™ to easily enhance text and graphics
- ABC Media Manager™ for "drag and drop" control of all graphics, such as clipart and logos
- 30,000 pieces of clipart, images and fonts

DELL DIMENSION

Reliable PCs For
High Performance
Computing

**DELL DIMENSION™ XPS P133c**

133MHz PENTIUM® PROCESSOR

- Mini Tower Model
- 16MB EDO Memory
- 256KB Pipeline Burst Cache
- 1.6GB Hard Drive (10ms)
- 15LS Monitor (13.7" v.i.s.)
- 9FX Motion Graphics Accelerator with 2MB VRAM
- 6X Multi-session EIDE CD-ROM Drive

• MS® Office Professional with
Bookshelf for Windows® 95

• Microsoft® Windows 95/30 Days
Free Support / MS Mouse

• 3 Year Limited Warranty

• Upgrade to 32MB of EDO memory
for only \$399 more.

Business Lease: \$81/Mo.
Order Code #500252



\$2199

**BEST
BETS
FOR
PC
BUYERS**

				COMMENTS
RANK	OVERALL RATING	MANUFACTURER AND MODEL/ PRICE	CONFIGURATION	
1	8.77	Dell Computer Dimension XPS P133c \$3,249 w/ monitor	Minitower, 133-Mhz Pentium, 16MB of memory, 1GB hard disk, quad- speed CD-ROM	Dell provides strong and preloads M- ing it
2	7.70			

BUSINESS WEEK CONFIRMS WHAT YOU ALREADY KNEW.

In search of the perfect PC? Just ask *Business Week*. In its First Annual Computer Buying Guide, the Dell Dimension XPS P133c was rated #1 among the "Best Bets for PC Buyers."

That's another best for Dell, a company famous for delivering the best performance, the best features, the best value. But that's probably not news to you, is it?



Designed for



Microsoft®
Windows® 95

*Tests conducted by the National Software Testing Laboratories, a division of McGraw-Hill, Cos. Published in *Business Week*, November 6, 1995. †For a complete copy of our Guarantees or Limited Warranties, please write Dell USA L.P., 2214 W. Braker Lane, Suite D, Austin, TX 78758. *Business leasing arranged by Leasing Group, Inc. *Prices and specifications valid in the U.S. only and subject to change without notice. The Intel Inside logo and Pentium are registered trademarks of Intel Corporation. MS, Microsoft, Windows and the Windows logo are registered trademarks of Microsoft Corporation. ©1996 Dell Computer Corporation. All rights reserved.

DELL

TO ORDER, CALL

800-626-9530

In Canada,* call 800-839-0148

Mon-Fri 7am-9pm CT • Sat 10am-6pm CT

Sun 12pm-5pm CT • <http://www.dell.com/>

Keycode #04260

Second Looks

LIVING WITH THE PRODUCTS WE REVIEW

By Brian Nadel

COMMUNICATIONS

Speeding Up CommSuite

IN OUR INITIAL REVIEW of Symantec Corp.'s Delrina CommSuite 95 (First Looks, March 12, 1996), we were impressed with the program's integration with the Windows 95 operating environment and its variety of communications features, from fax to data to telephony. But it seemed

that this integration was at the cost of performance, particularly when sending faxes with the suite's WinFax PRO 7.0 module on PCs equipped with less than 16MB of memory.

Symantec has released a CD-ROM that contains an assortment of bug fixes that generally speed up the process of sending and receiving faxes. Registered users should automatically receive this update by

mail; others can call Symantec at 800-441-7234. To update your system, just run SETUP.EXE on the disk; all the necessary files are replaced.

The net result is faster operation in several areas. For starters, accessing and sorting phone-book entries now occurs immediately, rather than after an annoying delay of up to a few seconds. But most users will agree that the most significant improvements are that

the Send fax dialog box appears on the screen faster and faxes are processed more efficiently. There's also a new Quick Fax Viewer that is accessible with a right-mouse-click.

Those who have stored the details of their lives in ACT will be pleased with the improved method for importing this information into CommSuite's PIM database. All is not



perfect, however.

During testing, a lightly shaded area of a Word document that we had faxed via WinFax PRO 7.0 arrived at our fax machine as an extremely dark ribbon that obscured the text.



BUG BRIEFS

PROBLEM

At one time or another, just about every Power Macintosh user has been frustrated by the mysterious Type 11 error that appears when a user tries to run older software designed for Macs that used a Motorola 68000 CPU.

SOLUTION

Apple has released update 2.07 of its operating system, System 7.5, that virtually eliminates Type 11 errors. The patch comprises 14 disks, so be careful to download only what you need (<http://www.apple.com>).

PROBLEM

As soon as someone puts together an airtight Internet security method, someone else comes along and cracks the code. Recently, researchers at Princeton University found a flaw in the Java Applet Security Manager.

SOLUTION

Go to Netscape's Web site (<http://www.netscape.com>) and download the patch that fixes the Java Applet Security Manager. Future versions of Navigator will have this fix integrated into the program.

MEMORY MANAGEMENT

Second Coming for Tired Micro Channel Computers

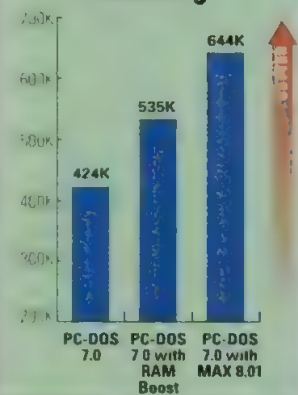
EVEN THE MOST ARDENT supporters of IBM's Micro Channel (MCA) PC architecture would agree that MCA is as dead as the dodo. But there are still hundreds of thousands of PS/2 desktop systems and early ThinkPad notebooks that use MCA.

To give these PCs a midlife shot of adrenaline, Qualitas has updated its memory and resource management program for Windows, MAX 8 (First Looks, March 12, 1996), by adding BlueMAX. This program's BIOS compression can help free up gobs of conventional memory for PS/2 Micro Channel PCs. The \$99.95 MAX 8.01 is available in retail outlets or direct from Qualitas (800-733-1377). Upgrades can be purchased from Qualitas for \$29.95.

We tested MAX 8.01—the version with BlueMAX—on a 386/25-based IBM PS/2 Model 70 with 8MB of RAM, a SCSI host adapter, and a Token-Ring network interface card. PC Labs tests showed that using MAX 8.01

yielded an additional 109K of conventional DOS memory compared with using IBM PC-DOS

Free Conventional Memory



7.0's built-in RAM Boost and 220K of surplus memory compared with using no memory management at all.

Although it's no fountain of youth for tired PCs, MAX 8.01 can breathe a little extra life into aging Micro Channel computers.

LOOKING AHEAD

Tell us what you love and hate about these products and we'll share the information in future issues. • ClarisWorks 4.0 • Color ink jet printers

• EZ-SCSI 4.0 • Lotus Notes Release 4 • Microsoft Internet Explorer • Netscape Navigator 2.0 • Pentium Pro PCs • RealAudio • SoftWindows • Win-

dows 95 utilities. Contact Brian Nadel directly via MCI Mail (556-1500) or CompuServe (72241,1616), or on the Internet at bnadel@zd.com.

7,083 E-mails,
9,126 voice mails,
383 calendar entries,
and 400 tasks.



{ No problem. }

GroupWise™ is the first
advanced messaging system
to combine E-mail, voice
mail, faxes, calendaring,
and scheduling into one
place—the Universal In Box.

~ It does all this so
effectively, *PC Computing*
gave GroupWise its '95
MVP award for best
E-mail and groupware
product. ~ Naturally,
GroupWise works great





with any network, but if you have NetWare® 4.1 and NDS™, you can manage your network *and* GroupWise users from one place. ~ In any case, you get performance that's won five million users. ~ What a way to rip through your day! ~ Find us at <http://groupwise.novell.com> or call 1-800-778-1851.

GroupWise



Novell

Everything's Connected™

DO NOT BITE THIS MONITOR.



WARNING:

The images you see on the new CTX PR900™ Professional Line Monitors are not real.

We say this because artists, graphic designers, and CAD/CAM users everywhere keep mistaking the PR900's sharp, distortion-free images for the objects they represent.

Maybe it's because the 21-inch PR900 offers the crispness of Diamondtron™ technology. With a colossal 19.6-inch viewable screen area and 0.31-mm aperture grille for uncommon contrast.

Or perhaps it's the PR900's 1600 x 1200 maximum resolution. And anti-glare, anti-

static, anti-reflection screen. With vibrant colors that make other monitors pale in comparison.

In any case, with features like Windows® 95 Plug & Play, TCO '92 Certification, and Power Management—plus PC, Mac & SPARC compatibility—the PR900 is an unreal buy.

Especially since it costs hundreds less than any monitor in its class.

Since seeing is believing, we invite you to visit your nearest CTX dealer. Just call 1-800-888-9052 or visit our web site at www.ctxintl.com. But remember—just look, don't bite.



The on-screen display (OSD) features over 30 user-friendly functions—for the most intricate adjustments.



CTX

Commitment To Excellence.

PR900 is a registered trademark of CTX. Other trademarks are the property of their respective owners.

See the new CTX PR900 at PC Expo, Booth #4562.

CIRCLE 329 ON READER SERVICE CARD

New & Improved

NEWS OF ANNOUNCED PRODUCTS AND UPGRADES

By Melissa J. Perenson

Make a Dash for the Web



YOUR WORLD WIDE WEB browser's bookmarks have become a convoluted nightmare to navigate. What's a Web surfer to do? Turn to Starfish Software's \$50 **Starfish Internet Utilities**, a clever Internet package that simplifies your return visits to favorite Web sites and monitors your on-line usage.

Based on the same intuitive Dashboard interface of Starfish's Windows 3.1 and Windows 95 navigation utilities, Internet Utilities includes the Internet Dashboard control panel and modules for monitoring your online time, system resources, and modem activity and for alerting you when favorite Web sites have been updated. You can also organize your collection of bookmarks with drag-and-drop simplicity and return to a Web site with a single mouse-click. Internet Utilities works with any 32-bit Web browser, including Netscape

Communications Corp.'s Netscape Navigator and Microsoft Corp.'s Internet Explorer.

Microhelp has released a Version 1.1 maintenance kit for its \$49.95 **PowerDesk**, a competitor to Dashboard 95. The kit adds the ability to include Web-site shortcuts in a PowerDesk panel.

Starfish Software Inc., Scotts Valley, CA; 800-765-7839, 408-461-5800; <http://www.starfishsoftware.com>. *Circle 410 on reader service card.*

Microhelp, Marietta, GA; 800-777-3322, 770-516-0899; <http://www.microhelp.com>. *Circle 411 on reader service card.*

Curvy Mike

LOOKING FOR A STYLISH microphone to use with your PC? MIDI Land's \$29.95 **MLI Free-D FD-02 Unidirection Multimedia Microphone** may sound like a mouthful of a name, but the microphone is as sleek as they get. The FD-02 has a flexible neck made out of pliable plastics and a high signal-to-noise ratio that eliminates ambient sound. **MIDI Land Inc.**, San Dimas, CA; 909-592-1168; fax, 909-592-6159. *Circle 412 on reader service card.*

Friendly Photo Editing

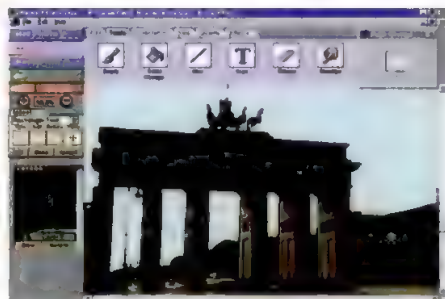
TIRED OF LOOKING AT THE HEAD OF SOME STRANGER WHO rudely walked into the middle of your prized vacation photo? Well, take a guided tour through the magic of image editing with Adobe Systems' \$90 **Adobe PhotoDeluxe** and you'll be able to remove the distracting object with ease. PhotoDeluxe provides an excellent assortment of image-editing tools.

Targeted toward both novice and experienced users, PhotoDeluxe has a user-friendly interface and two

modes: one that guides you through the process of executing particular image-editing functions and one that lets you fend for yourself. Create a greeting card, remove red-eye, touch up and transform photos, or combine images for unusual and creative results.

The software includes Berkeley Systems' After Dark engine for creating personalized photo screen savers and slide shows.

Adobe Systems Inc., Mountain View, CA; 800-888-6293, 415-961-4400; <http://www.adobe.com>. *Circle 413 on reader service card.*



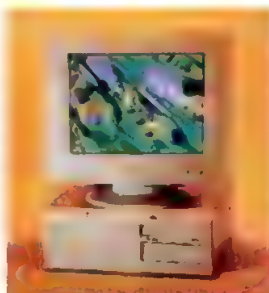
HOT PROSPECT

Dell's Optimum OptiPlex

Tired of the same-old-same-old PC? Dell Computer Corp. has upped the ante with its 32-bit optimized, high-end **OptiPlex** line of corporate Windows NT desktops. With prices starting at \$2,999 for a basic configuration and running to \$4,676 for a high-end configuration, the OptiPlex GXpro series, which is available with 180- and 200-MHz Pentium Pro processors, is on the cutting edge.

The GXpro systems utilize Intel's 440FX PCIset for improved desktop performance over the first-generation Pentium Pro core logic chip set. The systems also feature error correction code EDO memory, dual symmetric multiprocessing support, PCI 2.1, and bus mastering. There's also an integrated PCI bus-mastered 10-Mbps Ethernet. You have the option of getting either an STB Powergraph S364 Trio V+ 64-bit video card with 2MB of VRAM or a Number Nine Imagine II 128-bit video card with 4MB of VRAM. Systems come standard with 16MB of memory and a 1GB hard disk; 2GB and 4GB hard disks are also available. The streamlined systems feature Dell's new OptiFrame chassis for the ultimate in accessibility. There's a push-button cover and a hinged power supply as well as full access to the entire motherboard.

Dell Computer Corp., Austin, TX; 800-289-3355, 512-338-4400; fax, 512-728-4238. *Circle 409 on reader service card.*



Electronically Flowing Forms

SYMANTEC CORP.'S \$399 **FormFlow 2.0** makes great strides in the automation and flow of enterprise electronic forms. The package adds forms management, a graphical forms router, built-in tracking, in-box processing agents for automating the processing of incoming items, OLE 2.0 support, security, and application development for the BASIC language. The software has also expanded its native support for databases, including MS SQL Server 6, Oracle 7, and Sybase 10 and 11; there's also support for Lotus Notes and Microsoft Exchange.

Symantec Corp., Cupertino, CA; 800-441-7234, 541-334-6054; <http://www.delrina.com>. *Circle 414 on reader service card.*

Oh, What a Web We Weave

ADD YOUR VOICE TO THE Web with your own Web pages.

Corel Corp. has launched a number of Internet products that will help you design Web pages. The \$99 **CorelWEB.Designer** is a WYSIWYG HTML authoring toolkit that doesn't require familiarity with HTML. The toolkit also includes CorelWEB.Transit, which lets you convert word processor documents into HTML, and CorelWEB.Gallery, a library of over 8,000 backgrounds, separators, buttons, and clip-art images that are ready for use in your Web pages. CorelWEB.Gallery is also available separately for \$99.

THISoftware Company's \$69.95 **WebSite Maker** is another



GENESIS: CorelWEB.Designer.

package that will aid in Web-site design. Using templates, the software processes the color schemes, information, and links you provide into fully formatted HTML pages.

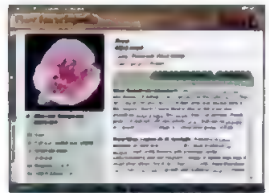
Corel Corp., Ottawa, Ontario, Canada; 800-772-6735, 613-728-3733; <http://www.corel.com>. *Circle 418 on reader service card.*

THISoftware Company Inc., Houston, TX; 800-804-6545, 713-785-4357; <http://www.thissoftware.com>. *Circle 419 on reader service card.*

Green Thumb's Time to Bloom

AFTER THE ENDLESS WINTER OF 1995-96, WELCOME SPRING and the forthcoming summer with the annual rites of gardening and home improvements. Two \$34.95 reference multimedia CD-ROMs from Microsoft Corp., **Microsoft Complete Gardening** and **Reader's Digest Complete Do-It-Yourself Guide**, and a \$39.95 CD-ROM from Hearst New Media, **In Full Bloom: Great Home Gardens**, will provide you with animations, audio and video clips, illustrations, and photos to help you plan your attack.

Microsoft Corp., Redmond, WA; 800-426-9400; <http://www.microsoft.com>. *Circle 415 on reader service card.*
Hearst New Media & Technology, New York, NY; 800-556-9182, 212-649-2700; <http://www.homearts.com>. *Circle 435 on reader service card.*



ROSY: Complete Gardening.

Finance Tutor

BRUSH UP ON YOUR UNDERstanding of the fundamentals of economics with CBT Worldwide's **CBTutor Financial Series** of interactive tutorials. These unique \$5,000 CD-ROMs, targeted toward those who deal in the financial markets

for a living, are based on seminars given by Dr. Philip Giles at Columbia Business School. The latest courses cover Bank Management, Financial Awareness, and the Money and Capital Markets.

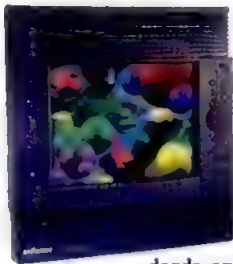
CBT Worldwide, Mamaroneck, NY; 914-698-1349; fax, 914-698-1481; [cibtww@aol.com](mailto:cbtww@aol.com). *Circle 416 on reader service card.*

Remote Connections

HAVING PURCHASED TRITON TECHNOLOGIES LAST YEAR, Artisoft has released **Insync CoSession Remote, Version 7.0**, formerly called CoSession. This \$79 two-PC package adds file synchronization, cloning, drag-and-drop transfers, NetWare and Winsock compatibility, simultaneous remote-control and file-transfer functionality, and the ability to transfer only the parts of a file that have been changed.

Artisoft Inc., Tucson, AZ; 800-846-9726, 520-670-7100; <http://www.artisoft.com>. *Circle 417 on reader service card.*

Keeping It InFocus



INFOCUS SYSTEMS ADDS TO ITS LINE OF LCD panels with the \$4,999 **PowerView 820**. Weighing less than 5 pounds, the 820 is a plug-and-play device that supports displays of crisp images at 16.7 million colors and true Super VGA 800-by-600 resolution (it's compatible with 1,024-by-768 as well). There's an integrated multimedia panel with hi-fi sound, an internal speaker, support for worldwide video standards, and external speaker control.

InFocus Systems Inc., Wilsonville, OR; 800-294-6400, 503-685-8888; <http://www.infs.com>. *Circle 420 on reader service card.*

BRIEFS

Books

Coming to you live from the trenches—er, cubicles—is cartoonist Scott Adams's humorous, sharp-witted take on the modern workplace. **The Dilbert Principle** is filled with Adams's perspective, gained while in "the cubicle" working as an engineer at Pacific Bell. Adams's incisive narrative is embellished and complemented by excerpts from his archive of comic strips (\$20, HarperCollins, 800-331-3761) Perplexed by the odd behavior of your Windows 95 system? Gain some helpful hints from **The Underground**

Guide to Windows 95, by Scot Finnie (\$22.95, Addison-Wesley Publishing Co., 617-944-3700) In the market for an ultimate guide to Java? **Java Unleashed** covers everything related to Java, ranging from applet programming to using Java with Netscape 2.0 JavaScript to HotJava (\$49, Macmillan Publishing, 800-428-5331).

Internet

Quadracy Corp.'s **WebWorks Publisher Version 3.0 for Windows** is an \$895 publishing package that works with Adobe Systems'

FrameMaker. **WebWorks** assists in the automation of the production and maintenance of professional-quality Web pages; the software offers translation of text and graphic formats into .GIF, HTML, and JPEG files, as well as support for HTML 3.0 tables (512-305-0240) McAfee's \$65 **VirusScan 2.5 for Windows NT** workstations and **NetShield 2.5 for NT servers** (\$450 for 25 nodes) extend McAfee's virus-protection packages to Windows NT (408-988-3832) Computational Logic's \$1,950 **Basic Internet Server Solution** provides a complete software bundle for

100MHZ PENTIUM CHIP, TFT, 16MB, LITHIUM, \$2999.

WinBook XP5



"Fastest
notebook yet..."

—PC World, April 1996

5 OUT OF 5: WINDOWS MAGAZINE'S HIGHEST RATING



"...the best design of any notebook I've tested."

—Michelle A. Tyrrell, Windows Magazine, March 1996



\$2399

WINBOOK XP5 75MHz

- 75MHz INTEL PENTIUM® PROCESSOR — POWER-SAVING NOTEBOOK CHIP
- 8MB RAM
- 540MB REMOVABLE HDD
- 256K L2 CACHE
- 14.4 SEND/RECEIVE FAX/VOICE/DATA MODEM
- 10.4" TFT ACTIVE MATRIX COLOR DISPLAY
- 3.5" 1.44MB DISKETTE DRIVE
- 6.1 POUNDS
- 32-BIT LOCAL-BUS VIDEO
- NIMH BATTERY W/ POWER MANAGEMENT
- 1MB VIDEO RAM
- TWO TYPE II OR ONE TYPE III PCMCIA SLOT
- INTEGRATED DUAL-BUTTON POINTING STICK, OPTIONAL DUAL-BUTTON TRACKBALL OR TOUCHPAD
- PARALLEL, SERIAL AND PS/2 PORTS

Double your RAM to 16MB for only \$399 at time of notebook purchase!

\$2999

WINBOOK XP5 100MHz

- 100MHz INTEL PENTIUM® PROCESSOR — POWER-SAVING NOTEBOOK CHIP
- 16MB RAM
- 810MB REMOVABLE HDD
- 256K L2 CACHE
- 14.4 SEND/RECEIVE FAX/VOICE/DATA MODEM
- 10.4" TFT ACTIVE MATRIX COLOR DISPLAY
- 3.5" 1.44MB DISKETTE DRIVE
- 6.1 POUNDS
- 32-BIT LOCAL-BUS VIDEO
- 40 WATT LITHIUM ION BATTERY W/ POWER MANAGEMENT
- 1MB VIDEO RAM
- TWO TYPE II OR ONE TYPE III PCMCIA SLOT
- INTEGRATED DUAL-BUTTON POINTING STICK, OPTIONAL DUAL-BUTTON TRACKBALL OR TOUCHPAD
- PARALLEL, SERIAL AND PS/2 PORTS

Add stereo sound for only \$79.95!

\$3199

WINBOOK XP5 120MHz

- 120MHz INTEL PENTIUM® PROCESSOR — POWER-SAVING NOTEBOOK CHIP
- 16MB RAM
- 810MB REMOVABLE HDD
- 256K L2 CACHE
- 14.4 SEND/RECEIVE FAX/VOICE/DATA MODEM
- 10.4" TFT ACTIVE MATRIX COLOR DISPLAY
- 3.5" 1.44MB DISKETTE DRIVE
- 6.1 POUNDS
- 32-BIT LOCAL-BUS VIDEO
- 40 WATT LITHIUM ION BATTERY W/ POWER MANAGEMENT
- 1MB VIDEO RAM
- TWO TYPE II OR ONE TYPE III PCMCIA SLOT
- INTEGRATED DUAL-BUTTON POINTING STICK, OPTIONAL DUAL-BUTTON TRACKBALL OR TOUCHPAD
- PARALLEL, SERIAL AND PS/2 PORTS

Add Synchburst cache and 1.3GB HD, \$300!



\$399

**DOCKING
STATION**
w/4x CD-ROM,
EXPANSION BAY
AND SLOTS

A WinBook XP for every budget, starting at \$1599!

\$1599

WINBOOK XP 75MHz

- 75MHz INTEL® 486 PROCESSOR
- 8MB RAM
- 540MB REMOVABLE HDD
- 14.4 SEND/RECEIVE FAX/VOICE/DATA MODEM
- 10.3" DUAL-SCAN COLOR DISPLAY

\$1999

WINBOOK XP 100MHz

- 100MHz INTEL® 486 PROCESSOR
- 16MB RAM
- 810MB REMOVABLE HDD
- 14.4 SEND/RECEIVE FAX/VOICE/DATA MODEM
- 10.3" DUAL-SCAN COLOR DISPLAY

PLUS MANY MORE QUALITY STANDARD WINBOOK XP FEATURES!

WinBook

COMPUTER CORPORATION

a subsidiary of Micro Electronics, Inc.

CIRCLE 085 ON READER SERVICE CARD

CALL US TODAY, TOLL-FREE

1-800-468-0513

Monday-Friday, 8am-9pm EST • Saturday, 9am-4pm

Use your VISA, Discover Card, MasterCard, personal check or P.O. with credit approval
U.S. sales only 30-day unconditional money-back guarantee from date of purchase

Options include your choice of integrated touchpad or trackball pointing devices, 3-year extended limited warranty, stereo sound, WinBook carrying cases, 28.8 Fax/Modem PCMCIA card and more!

©1996 WinBook Computer Corporation. All rights reserved. WinBook is a registered trademark of Micro Electronics, Inc. The Intel Inside logo and Pentium are registered trademarks of the Intel Corporation. All other trademarks and registered trademarks are property of their respective corporations. All prices and specifications are subject to change without notice or obligation. Prices do not include shipping.



Leading Pentium processor/PCI performance at an affordable price.

- Intel 75, 90, 100, 120 or 133 MHz Pentium processors
- Desktop and minitower packages
- 256KB cache
- 6-16MB RAM, expandable to 128 or 192MB
- EDO RAM on some models
- PCI/ISA architecture
- 420MB** high-performance Enhanced-IDE hard drive
- PCI integrated graphics accelerator and 1MB of VRAM standard, upgradable to 2MB or Matrox Millennium PCI graphics card with 3D acceleration and 2MB of WRAM, upgradable to 4MB
- Flash BIOS for easy upgrade
- Full plug-and-play capability
- Designed for Windows 95
- Preloaded HP DMI250 Desktop Management Interface
- Free three-year limited warranty for parts and labor¹

from **\$1,469***



HP Vectra VL

Redefining network-ready PCs for the workgroup.

- Intel 75, 90, 120 or 133 MHz Pentium processors
- Leading Remote Management (HP DMI250) preinstalled
- PCI integrated 32-bit 10baseT Ethernet interface
- Network certified and preconfigured for Microsoft and Novell clients
- Parallel Transfer Driver preinstalled for faster LAN packet processing
- Standard 256KB second level cache
- 64-bit graphics accelerator (Cirrus Logic 5434) on PCI bus
- 1MB of video RAM standard, expandable to 2MB
- 8MB RAM, expandable to 192MB
- Enhanced-IDE controller on PCI bus
- 420MB** high-performance Enhanced-IDE hard drive
- 4 mass storage shelves (3 front accessible), 4 expansion slots
- Two 32-bit PCI slots
- Flash BIOS for easy upgrade
- Designed for Windows 95
- Free three-year limited warranty for parts and labor¹

from **\$1,539***



HP Vectra XM

The ultimate PC for advanced business and technical applications.

- Intel 120 or 133 MHz Pentium processors
- Supports dual processing with secondary processor socket
- 512KB second level burst synchronous write-back cache
- Two 32-bit PCI slots, 1 PCI/ISA combo slot, 1 ISA slot
- 1,000MB** high-performance Enhanced-IDE hard drive
- Integrated 32-bit PCI Fast SCSI-2 and Enhanced-IDE interfaces
- Integrated PCI Matrox Millennium graphics card with up to 1600 x 1200 resolution
- 16MB of RAM standard, expandable to 256MB
- Integrated PCI 32-bit 10BaseT and Coax network interface
- Preloaded Desktop Management Interface (DMI)
- Free three-year limited warranty for parts and labor¹

from **\$3,389***



HP Vectra XU

The fastest PC available.

- Intel Pentium Pro 150 MHz processor with 256KB integrated cache
- Supports dual processing with secondary Pentium Pro processor socket
- 128-bit high performance memory architecture
- 16MB of ECC DIMM memory standard, expandable to 256MB with 8 DIMM memory expansion sockets
- PCI integrated Ultra SCSI Fast 20 interface with 20MB/s throughput
- 1,000MB** SCSI-2 high-performance hard drive
- PCI Matrox Millennium graphics card with 3D acceleration and 2 MB of WRAM, upgradable to 4MB or 8MB
- 7 mass storage shelves (5 front accessible)
- 6 expansion slots: 3 PCI, 1 PCI/ISA combo and 2 ISA
- 10 Base-T/100VG AnyLAN selectable PCI NIC with up to 100 Mb/s throughput
- Integrated 16-bit audio and 4X CD-ROM
- Microsoft Windows NT 3.51
- Free three-year limited warranty for parts and labor†

from **\$5,159***



HP Vectra XU 6/150

Exceptional performance and expandability at an affordable price.

- Intel Pentium Pro 150 MHz processor with 256KB integrated cache
- 128-bit high performance memory architecture
- 16MB of DIMM memory standard, expandable to 256MB with 8 DIMM memory expansion sockets
- 1,000MB** Enhanced-IDE hard drive
- PCI Matrox Millennium graphics card with 3D acceleration and 2MB of WRAM, upgradable to 4MB or 8MB
- 7 mass storage shelves (5 front accessible)
- 6 expansion slots: 3 PCI, 1 PCI/ISA combo and 2 ISA
- Integrated 16-bit audio and 4X CD-ROM
- Microsoft Windows NT 3.51 or IBM OS/2 Warp
- Free three-year limited warranty for parts and labor†

from **\$4,519***



HP Vectra VT

Since Compaq and IBM don't get the concept of 'value pricing,'

HP PCs would like to shed some light on the subject.

What it *doesn't* mean: bare-bones PCs with pared-down prices. What it *does* mean: PCs with all the features you need for much less than you'd expect to pay. Five prime examples are highlighted here. Compare their features and prices with the other leading brands, and you'll see why HP is the only one inviting comparison. Our entire line represents the best values in the business PC market. From value-priced Pentium® processor-based PCs to our blistering hot, dual Pentium Pro processor-based HP Vectra XU PC.

Call 1-800-322-HP-PC, Ext. 1106† for more information or the name of your nearest HP reseller. Or visit us at <http://www.hp.com/go/vectra>. For once, more is less.

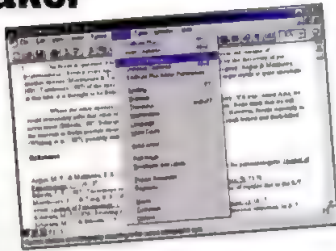


**HEWLETT
PACKARD**

Bibliography Maker

IF YOU FIND YOURSELF writing papers and documents that need bibliographic annotations, then Niles & Associates' \$299 **EndNote Plus 2.1** is a required add-on. EndNote Plus is a database and citation maker that stores, organizes, and offers searching across bibliographic references. The major news with this upgrade is the inclusion of an add-on that integrates EndNote Plus into Microsoft Word 7.0 for Windows 95, Word 6.0 for Windows 3.1, and Windows NT. This means you can complete all of your bibliographic formatting directly from Word's Tools menu.

Niles & Associates, Berkeley, CA; 800-554-3049, 510-559-8592; <http://www.niles.com>. Circle 421 on reader service card.



Faxing in 3-D

FORGET ABOUT THE BORING, one-dimensional faxes piled on your desk; with InfoImaging's \$99 **3D Fax 2.0** and \$249 **3D Fax-Scan**, you can fax any data or multimedia file.

InfoImaging's engine will compress and encode these files for faxing over e-mail, either via a modem-to-modem transfer or a modem-to-fax-machine transfer. The recipient's 3D Fax then decodes the file and presents its contents in their original file format. According to InfoImaging, you can transmit up to 110K of compressed data on a single page. A freeware version is available at <http://www.infoimaging.com>.

3D Fax has two modules, one for sending (encoding) and another for reading (decoding) files. 3D FaxScan is a different take on the data-transmission peripheral. Combining the strengths of a fax modem and a standalone fax machine, 3D FaxScan connects between the PC and your telephone line to capture and store up to 30 pages of faxes in 512K of memory. 3D FaxScan also automatically displays the electronic and hard-copy versions of incoming faxes and lets you retrieve faxes at any time, regardless of whether your PC or fax machine is powered-on.

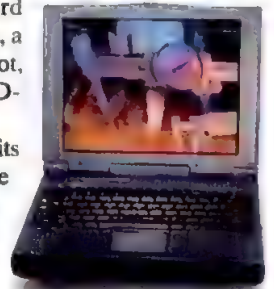
InfoImaging Technologies Inc., Palo Alto, CA; 800-966-1140, 415-960-0100; fax, 415-960-0200. Circle 422 on reader service card.

Have Pentium, Will Travel

ONCE A HIGH-END RARITY, PENTIUM NOTEBOOKS ARE NOW the norm at all levels.

WinBook Corp. has a new high end with the addition of the **WinBook FX** to its line of notebooks. Priced at \$3,999, the WinBook FX comes with a Pentium/133 processor, 16MB of EDO RAM, 256K of synchronous-burst cache, a 1.3GB hard disk, an 11.3-inch active-matrix display, a lithium ion battery, a Type III PC Card slot, and a modular internal quad-speed CD-ROM drive.

Digital Equipment Corp. has upgraded its ultracompact, well-designed Digital HiNote Ultra to include Pentium processors ranging in speed from 100 to 133 MHz. The **HiNote Ultra II**, priced at \$3,199 for a basic configuration, comes with 8MB of RAM; removable hard disk options of 810MB, 1.08GB, and 1.35GB; 256K of L2 cache, one Type III PC Card slot, and an IrDA port; and a 10.4-inch screen available with either VGA or Super VGA displays. At just 3.96 pounds, the unit has a lithium ion battery that attaches to the back of the unit and provides a comfortable tilt, while the floppy disk drive dock attaches beneath the system. A \$699 quad-speed CD-ROM drive dock is also available.



SPECIAL FX: WinBook FX.



JUMP: AST's Ascentia J.

Products in AST Research's **Ascentia J** series of notebooks start at \$2,199 and have Pentium/75 to Pentium/133 processors, 8MB of RAM, 500MB or 800MB removable hard disks, floppy disk drives, IrDA ports, Type III PC Card slots, and integrated 14.4-Kbps modems.

WinBook Corp., Columbus, OH; 800-468-2162; fax, 800-448-0308. Circle 425 on reader service card.
Digital Equipment Corp., Maynard, MA; 800-642-4532, 508-460-8894; <http://www.pc.digital.com>. Circle 423 on reader service card.
AST Research Inc., Irvine, CA; 800-876-4278, 714-727-4141; <http://www.ast.com>. Circle 424 on reader service card.

BRIEFS

installing and maintaining an Internet server (512-322-9955).

Hardware

For high-performance CD-ROM mastering, FWB has the \$2,199 **HammerCD-R 4x for Windows**. The drive can write a 650MB disk in less than 20 minutes and features 600-KBps sustained throughput during high-speed recording sessions (415-325-4392) For environments that require multiple networked CD-ROM drives, Procom Technology's \$7,725 **CD Tower-14 Ethernet** features 14 quad-

speed CD-ROMs and is designed to install on an Ethernet network running NetWare without requiring that the network first be shut down (714-852-1000).

Software

Need a quick utility for viewing graphics, spreadsheet, and word processor files amongst different formats? CADsystems Unlimited's **Slick! Version 4.0** does all that and more, and it can also handle .ZIP files. Over 200 file formats are supported by Slick!, and you can use the software to print or save

any of these files (408-562-5762) Crystal has released several Crystal Web extensions that let you publish to Web servers housing information from databases, database applications, and data-warehouse solutions. The extensions are for use with **Crystal Reports 4.5** and **Crystal Info 4.5** (800-877-2340) Tired of hunting and pecking on your keyboard? Turn yourself into a touch-typist with Individual Software's enhanced **Typing Instructor Deluxe CD**. The \$40 Windows 95 disk provides fun and helpful practice drills to test your typing skills (510-734-6767).

Designed for
Microsoft
Windows 95



If you're sold on HP PCs for the desktop,
you'll really get
carried away
with this.

Now you don't have to settle for less when you leave the office. Because we've packed the performance of an HP desktop PC into our HP OmniBook 5000 notebook.

So you can take off with up to 120 MHz of Pentium[®] processor power, turbo-charged by our full 32-bit PCI architecture. When you return to the office, simply slide your OmniBook 5000 into the Docking Station and keep working.

The uncompromising desktop performance you expect from HP, including SVGA active matrix displays, up to 1.2GB hard drives, SCSI II port for CD-ROM support and stereo Sound Blaster compatible sound, have made our OmniBook a real winner. In fact, Hewlett-Packard just received the 1995 J.D. Power and Associates Award for Highest Customer Satisfaction among Notebook Computer Business Users.¹

Call 1-800-443-1254, Ext. 367,¹ for more information. You'll find that good news travels fast.

Desktop performance to go.

- Intel 75, 90 or 120 MHz Pentium processor
- 256KB synchronous L2 cache
- 32-bit PCI bus architecture for accelerated graphics performance
- Large 10.4" color display
- 8 or 16MB RAM standard, expandable to 64MB
- Up to 1.2GB hard drive
- Type III PCMCIA card slot (or use as two Type II slots)
- Built-in infrared port for easy no-cable connection to printer or PC
- Instant on/off for faster application access
- Built-in stereo sound with Sound Blaster support, MIDI and stereo speakers
- CD-ROM capable (with SCSI II port)
- Built-in serial, parallel, SVGA-out, stereo sound and keyboard/mouse ports
- Optional second battery can substitute as floppy disk drive
- Optional Docking System recommends 2 full-length ISA cards or 1 ISA and 1 PCI card, and includes standard ports for SCSI-2, MIDI/joystick and stereo sound
- EPA Energy Star Certified
- Three-year limited warranty

from **\$4,975***




**HP OmniBook 5000
Docking Station**
*For easy connections
back in the office.*
from **\$650**


HP OmniBook 5000VL
*Desktop performance
in a slim package.*
from **\$2,925***



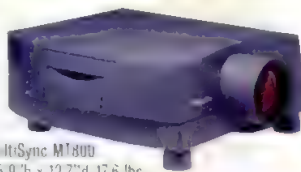
HP OmniBook 5000

Average of 10 attributes: price, reliability, performance, accessories, value, portability, integrated connectivity, satisfaction. Study: Office Based Businessmen. Study conducted among 2,000 business professionals. The product name, logo and HP logo are registered trademarks of Hewlett-Packard Company. © 1995 Hewlett-Packard Company. PPG428

 **HEWLETT®
PACKARD**

With their extraordinary lightweight design, the new MultiSync MT600 and MT800 projectors can go anywhere you can go. Down the hall, or down the road.

And thanks to their uncanny ability to project



MultiSync MT800
16.2" w x 5.9" h x 12.7" d, 17.6 lbs.

bright, crisp and evenly illuminated images, you no longer have to sacrifice image quality for portability.

You see, MultiSync MT™ projectors deliver full-color, high-resolution images that can be adjusted to as large as 300" diagonally. A simple task via a remote that



MultiSync MT600
16.2" w x 5.9" h x 12.7" d, 16.5 lbs.

**EXACTLY HOW PORTABLE ARE THE
GRIP THE SIDES OF THIS MAGAZINE**



controls your computer and presentation, as well as the projector.

All you have to do is plug in a source, which, due to simple connectivity and compatibility, can be anything from a notebook computer to a VCR.

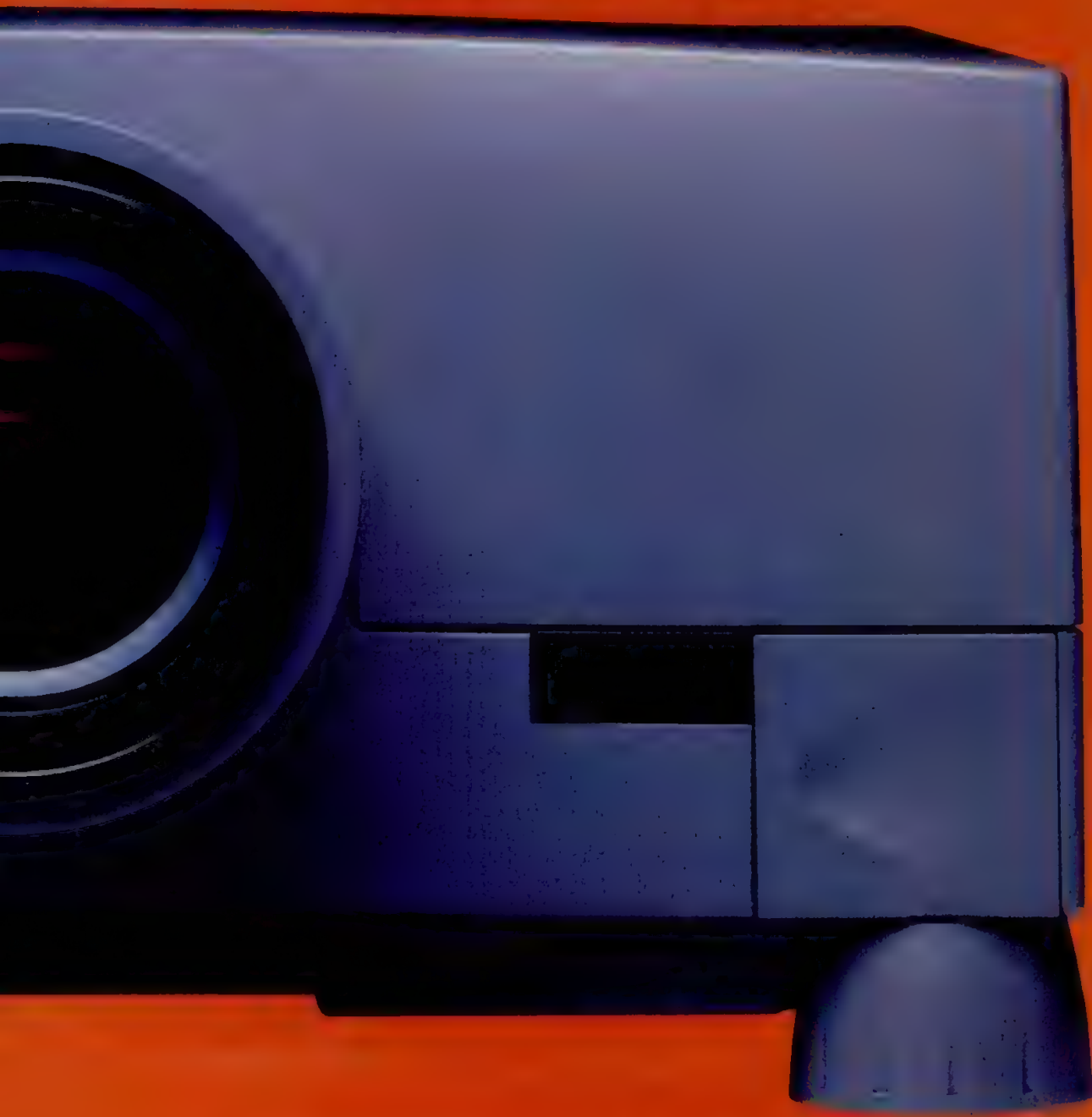
Now, shouldn't you explain all this to your coworkers? They're still wondering why you strolled past the water cooler holding this

magazine out in front of you. To find out how to get a hold of the real thing, call 1-800-NEC-INFO.

SEE, HEAR AND FEEL THE DIFFERENCE.™

NEC

NEW MULTISYNC MT PROJECTORS? AND WALK AROUND THE OFFICE.



Introducing SimpleJack™

The opening you've been waiting for.

Presenting the world's first integrated in-line, direct-connect PC Card phone jack.

The SimpleJack™ Advantage

Simple to use. Flip open SimpleJack™ and plug in a standard telephone line. That's all. No more interface cables to fuss with or lose.

Horizontal connection. With SimpleJack™, phone cords are kept safely flat on the table, away from your hands and other hardware attachments.

Versatile. SimpleJack™ can be shifted to the PC Card's external port to make room for a second PC Card. Then it can be inserted back into the card for travel.

It may look small. But the fact is, our new SimpleJack is the biggest thing to hit portable communications since, well, the Pony Express.

Because now connecting your portable to a phone line is as fast and easy as popping open SimpleJack and plugging in a standard RJ-11 phone cord.

SimpleJack accepts phone cords directly, without awkward proprietary interface cables. And SimpleJack's unique horizontal position keeps phone cords safely flat on the table.

You can open and close SimpleJack inside your portable's stacked Type II PCMCIA slot. Or, SimpleJack can be shifted to the card's external port to make room for a second PC Card.

SimpleJack is just one of the many advanced features you'll find in our 28.8

Communicator. Powerful MNP10-EC and TX-CEL cellular error control and avoidance technology makes calling over a cellphone more reliable.

Voice mail capabilities allow

you to automatically record incoming calls.

And versatile communications software for Windows® 3.1 and 95 make it easy to send and receive faxes, data and access the Internet.

To find out more about

SimpleJack, call us today at 1-800-4-SIMPLE (1-800-474-6753).

Because in today's world, you need more than just the right technology.

You need the right connections.

28.8 Communicator with

SimpleJack™

- Direct in-line RJ-11 phone connector
- 28,800 bps V.34 data
- 14,400 bps fax
- Cellular ready
- MNP10-EC cellular error correction
- TX-CEL cellular error avoidance
- Digital line guard
- Complete voice mail capabilities on systems with integrated sound
- Ultrasonically welded steel case
- Windows® 3.1 and 95 compatible communications software
- Five year warranty



Use a direct-connect cable to plug a cell phone directly into the 28.8 Communicator with SimpleJack.



Simple Technology offers a complete line of plug 'n' play communication, networking and memory PC Cards for today's mobile professionals.

1 - 8 0 0 - 4 - S I M P L E

<http://www.simpletech.com>

simple
TECHNOLOGY

CIRCLE 248 ON READER SERVICE CARD



Ethernet LAN Adapter
Approved PC Card

*Patent-pending

For instant product information call our fax-on-demand: 1-800-429-5626 x500

Breaking the Law

The first law of photography is "Never go into the field with untested equipment." I broke that rule—big-time. The morning of the day I flew with my family to Greece for an eight-day tour, I picked up an Epson PhotoPC. Without even reading

the manual, I loaded the software onto my Gateway Liberty subnotebook and tossed them both into my bag. Of course, we had three other cameras, so we wouldn't come back empty-handed in case it all went wrong.

The PhotoPC is a breakthrough product in digital cameras. It captures an image with full 640-by-480 resolution and 16 million colors in a camera that costs less than \$500. In its standard 1MB configuration, it holds up to 16 images, which you then upload to your PC via a supplied serial cable. The camera compresses the images into JPEG format, so depending on the content of the images, you can actually get more than 16 into memory. We got 20 in there a couple of times.

The camera came out on the plane, and we passed it around, taking pictures of others in our group. I uploaded the pictures to the laptop on the spot. Before the trip was over, I had more than 200 images on the hard disk. I edited some with the included EZ Photo software, others with Paint Shop Pro. EZ Photo, from Storm Software, lets you adjust color, brightness, and contrast, as well as the cropping. Paint Shop Pro, a shareware program from JASC, offers a full range of digital filters and manipulations.

In use, the PhotoPC is utter simplicity. It's a fixed-focus, point-and-shoot device, although its f5.6 lens and relatively "fast" charge-coupled device (CCD) let it see everything from 2 feet to infinity. An LCD and a few buttons atop the camera let you set the resolution, flash mode, and self-timer. You can also clear the last picture you took (handy if you know you've messed up) or erase all the pictures stored in memory. You have to be careful not to flick the camera off for a couple of seconds after you take the picture; the CCD is progressively scanned into memory as the image is compressed. Turning it off produces an image that's complete but with a part that's lower in resolution and contrast. (A small LED flashes to remind you that the camera's working, but it's easy to overlook.)

I found myself yearning for a zoom lens. Our compact

Minolta and Ricoh cameras were far more flexible in framing shots and getting close-ups. Battery life was better than expected. Despite the dire warnings in the manual that the camera drains the batteries heavily during upload, the four AA alkalines, which had already lasted for 150 pictures,

were not fully exhausted when I replaced them. I also spent some time controlling the camera from my laptop, an operation for which Epson recommends an external AC adapter. Sorry, guys. I couldn't find a plug on the Acropolis. I wished for the optional memory upgrade, too. Dragging a laptop around with you to upload pictures a couple of times a day is no fun.

The effort was worth it, though. The pictures look great on our big-screen TV set, which I coupled to the computer through a TelevEyes Plus VGA-to-NTSC converter. Digital photography really shines in this arena. I put together a slide show on the spot by copying the pictures I wanted into another directory, then using WinJPEG, a \$6.99 shareware program, to display them in slide-show fashion. My 11-year-old son took a laptop to school with the TelevEyes converter to show his classmates some highlights from the trip (but the principal banned nude statues).

PhotoPC's image size and resolution are perfect for TV display—more resolution doesn't get you a better image. But what if I had taken a camcorder and used a Snappy Video Snapshot to make stills? Or, in this age of 1-hour developing, how about scanning the prints? The Snappy can make impressive stills from tape, and

the higher resolution can be beneficial if you need to crop the image. But I got even better results scanning in standard photographic prints with the new Logitech PageScan Color scanner. It stands to reason: Emulsion-based photography has an inherent resolution in the thousands-of-dots-per-inch range, with nearly continuous color gradations. The PageScan scans at 200 dpi, giving you some overhead for cropping. But for one-step camera-to-PC simplicity, the PhotoPC can't be beat.

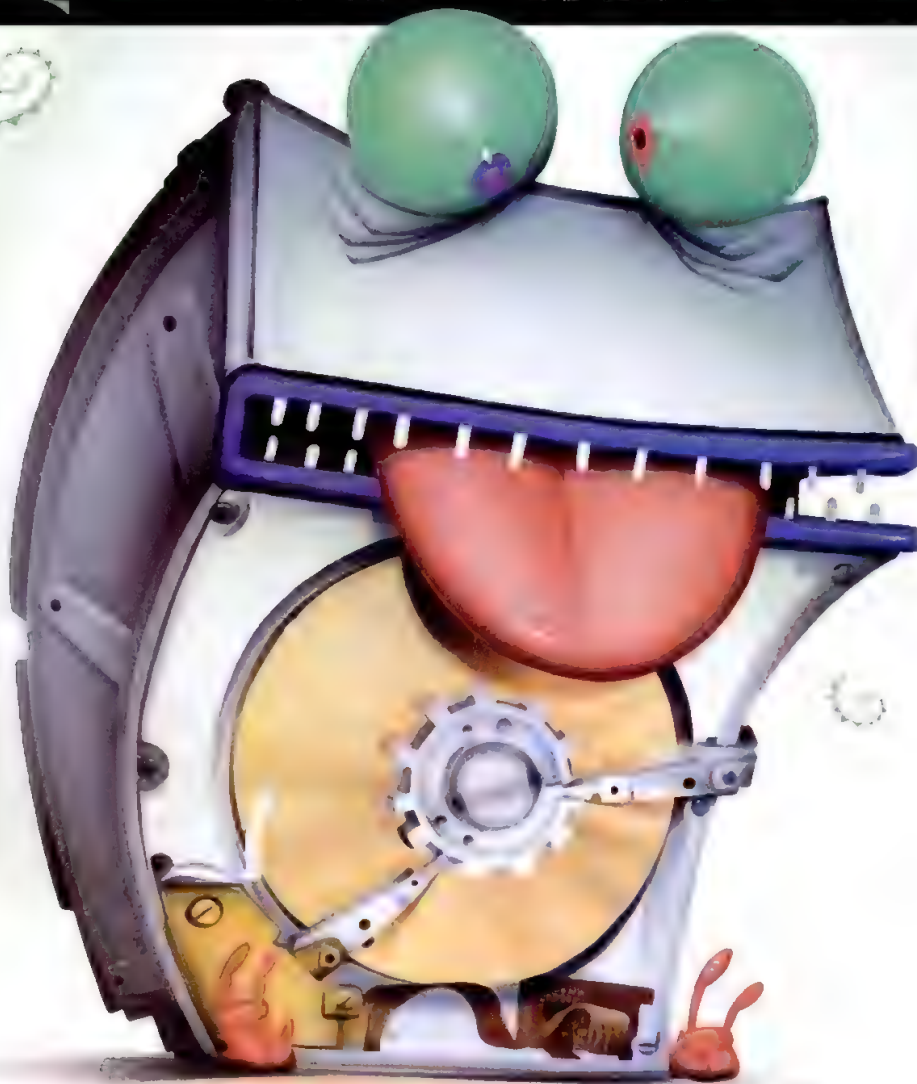
Okay, I broke the law. But I'm glad I did. □



PHOTO OP

OK, so I dragged a notebook with me on vacation—and uploaded some great digital shots.

IT'S WHAT KEEPS YOUR GIG DRIVE FROM GAGGING.



SCSI. The cool connection for hot peripherals.

Hard drives with SCSI (pronounced scuzzy) are the fastest, highest capacity hard drives available. And, only SCSI hard drives let you multitask. It's just one more reason to give your PC a SCSI connection. To learn more about Adaptec® SCSI host adapters and to enter to win a free SCSI two gigabyte hard drive, or other prize,† call 1-800-655-3977 ext. 2142, or visit our home page at <http://www.adaptec.com>*

adaptec®

I/O. NOW MORE IMPORTANT THAN EVER.

†Register and request a copy of official rules and sweepstakes details. Limit one entry per legal U.S. resident. No purchase necessary. *For information by fax, dial 1-408-945-2570 ext. 2142, request document no. 14070. ©1995 Adaptec, Inc. All rights reserved. Adaptec and the Adaptec logo are trademarks of Adaptec, Inc., which may be registered in some jurisdictions.

CIRCLE 218 ON READER SERVICE CARD

It's the Internet, Stupid

There is no more bandwidth. Once everyone gets connected with their ISDN and cable modems, they're going to find that everything is busy. The system is already at capacity. Nobody wants to talk about it.—*Chicken Little '96*

I laughed when I read this. But I stopped laughing when one night I couldn't access any World Wide Web sites. Everything was slow. These delays are becoming more frequent. What will happen when the entire country is online?

Some years ago, as I was pondering this scenario, I mentioned my concerns to a telephone company executive. The executive assured me that the phone companies could build capacity at an alarming rate, and if there were demand for bigger "pipes," then they would be built. But recently, an employee at a small Internet Service Provider (ISP) in Port Townsend, Washington, told me that his company can't get a simple T1 line, which was ordered six months ago. U S West keeps saying "tomorrow, tomorrow," but never delivers. And U S West is the company that wants to be the first to supply the new Asymmetrical Digital Subscriber Line (ADSL) technology? Hah. It can't deliver what it already offers, let alone an unproven technology still on the drawing board.

Fact is the phone companies are *not* keeping up with demand and are totally clueless about the Internet. They are so preoccupied with the old model that they can't see the potential for making boatloads of money by simply adding more and bigger wires. Worse, the telcos are easily sidetracked by dubious issues. Who cares if Internet technology can allow users to make a mediocre long-distance call, for example? Telcos are bitching to Congress about it. Gee, I wonder if they also object to kids using two tin cans and a string to communicate—it's about the same thing.

The telcos had better figure out fast what is going on. Over the years they have tended to react only when some technology threatened to bypass them. Make no mistake, the whole notion of ADSL is a direct response to the threat posed by cable modems. Until cable modems flop, the telcos will be announcing a slew of premature technologies while sitting idly on real technologies such as frame relay and ISDN. And if cable modems don't flop, expect to see the telcos buying cable companies like there is no tomorrow. The next technology to threaten to bypass these guys will be satel-

lites. One of the subsidiaries of Taiwan-based Acer is expected to announce an under-\$2,000 uplink/downlink system within the next year. Others will offer downlink satellite services, using regular phone lines to transmit the uplink requests. People want to be hooked up, and if the phone company can't do it, then someone else will.

To see just how clueless telcos are, look at AT&T's new Internet service, WorldNet. AT&T was swamped with orders because, it said, the demand for free or low-cost Internet access was unexpected. How dumb can they be? Then AT&T told customers they need special AT&T software to browse the Web, as opposed to using any browser of choice, effectively killing off any chance of immediate success. Of course, that assumes you could get the software at all. Nobody I know could get an account. All this can and will change, but in the meantime the telcos are proving once again that they just don't get it. Until they do get it, the phone companies will make enough mistakes to keep the current ISPs in business for a long time.

What the telcos should do is to skip the ISP part of the business and leave it up to the local independents—at least until things shake out. Let the ISPs handhold individual users. The telcos can't do it. Heck, many can't even program their own switches, and none of the telcos understand server technology. All their efforts should go to deploying fiber and copper as fast as possible. The phone company is the tollkeeper to the interstate. Once the road

is built, the tollkeeper just collects fees and maintains the road. With people putting second and third phone lines into their homes, the telcos should make a fortune on basic services. My house has three dedicated lines plus an ISDN connection for a total of five distinct lines. There's also a cell phone in my car. Somebody must be making money off this.

The telecommunications boom, which began with cell phones, has accelerated with the expansion of the Internet because of the simple fact that the Net requires more bandwidth than voice lines can deliver. The phone companies must have seen this coming. But you sure wouldn't know it from looking at their track record.



I WANT MY WEB

People want to be hooked up, and if the telcos won't do it, someone else will.

EUROPEAN ART COMES TO THE SCREEN, WITHOUT THOSE ANNOYING SUBTITLES.



From the continent that gave us museums and luxury automobiles come their combined spiritual equivalent: Nokia monitors. Nokia is already a household name (and cafe and office name too) throughout Europe. And now Nokia monitors are quickly winning the hearts and eyes of Americans too.

The European passion for beauty is expressed in the magnificent clarity of the screens and the soothing refresh rates.* The Nordic obsession with technical perfection is embodied in the variety and sensitivity of Nokia's controls and components. And the continental lust for life and good health is evident in the

extraordinary TCO-compliant emissions controls Nokia invented.

Add to this the sheer elegance of the tooling and Plug 'N' Play connectivity under Windows® 95.

A Nokia monitor is more than electronics. It's art. But, it's an avant garde that's quite easy to appreciate.

Especially when it makes those darn little subtitles so much easier for you to read.



Nokia is the leading brand of monitors in Europe and an engineering standard for the world.

For more information call

1.800.BY NOKIA.

Dept. Code: N41



NOKIA

MONITORS



*When used with an appropriate graphics card. Models are continuously upgraded. Size of CRT measured diagonally. Actual viewing size is slightly less. Manufactured and designed in Finland in an ISO 9001 approved environment. ©1996 Nokia Display Products, Inc. MultiGraph, ValueGraph, MicroEmission and FullScreen are trademarks of Nokia Display Products, Inc. EMail: bynokia@aol.com. Prices and specifications subject to change without notice. The Energy Star emblem does not represent EPA endorsement of any product or service. All other trademarks are the sole property of their respective companies.

Inside Track

Intel Ready to Turn the Screws Dept.: There was an interesting article in a recent *Microprocessor Report* (<http://www.chipanalyst.com>) that, combined with other reports, leads me to believe that by the end of the year the **Intel MMX strategy** will be in full swing. The editorial was titled "Intel Takes a Breather, Product Introductions Slow/ ASPs Fall as Pentium Cycle Nears Peak." I was amused by this because, if my sources are correct, this so-called breather is nothing more than the calm before a major storm.

Details are starting to emerge from people privy to the MMX strategy. The most interesting thing I've read recently concerned how Intel "won't admit" that MMX stands for "multimedia extensions." Of course, if it doesn't mean that, what does it mean? **Matrix Math Extensions**, that's what. These extensions, which will **quadruple processing power** and create a new market boom throughout 1997, are hardly what I'd call "taking a breather." In fact, this so-called slow period only seems slow because Intel **cannot push** these technologies on the public now out of fear that this would sink the current market for Pentium machines. People love to wait for something better just around the corner. Since the MMX is so capable as a chip—requiring less peripheral support in a system—MMX machines will be cheaper to make and much more powerful. The computer makers will sell a ton of these things, but first they have to **get rid of their inventory** of Pentium PCs between now and 1997. Look for fire sales by the end of the year. A bonanza. Then again, if I were you, I might just wait for the MMX-based systems.

What about Cyrix? I recently got a letter expressing concern about my interpretation of events:

John: Despite your claims in a recent column, Cyrix was not "arrogantly" going our own way on MMX. Cyrix was part of an industry group (including AMD) which was defining an alternative standard in case Intel kept MMX proprietary. We're glad that's not the case and we will be MMX-compatible in future CPU implementations. Cheers, Lew Paceley, VP Marketing, Cyrix.

Well, it's nice to know that everyone is going to follow Intel as best they can, Cyrix included. In a recent Inside Track column, I noted how Cyrix was getting into the motherboard business and assumed that the company was going to **emulate the Intel strategy** of making motherboards to promote its technology and shorten the design cycle. I had no idea it was really going to bring out a branded product with the Cyrix name on the outside of the box (<http://www.cyrix.com>). Cyrix then did some anti-Gateway ads showing the Cyrix system crushing a cow. It seems like

*MMX machines will be
cheaper to make and
much more powerful.*

*Computer makers will sell
a ton of these things, but
first they have to get rid
of their inventory of
Pentium PCs.*

an interesting PC and, at this point, the 166-MHz 6x86 Cyrix is **probably the absolute fastest Windows 95 machine** available.

Racking Up Numbers Dept.: They're called **hitbots**, and they are programs used by World Wide Web sites to generate **bogus numbers** that probably do nobody any good. Sponsors of various sites have been accusing each other of using these calculations to make their sites appear more popular than they really are. Hopefully, the new companies that specialize in monitoring such activity have the right kind of technologists on staff to counter statements based on rigged statistics. Nobody knows yet if they do.

According to some online complain-ers, *Penthouse* was one of the early developers of this hitbot technology. The company allegedly used it to **bully Nielsen Research**. The whole mini-scandal just seems like more free publicity for *Penthouse*. Thought you should know.

Gratuitous Plug Dept.: If you haven't gone to a 28.8-Kbps V.34 modem, then you are missing what life has to offer. Most of these **modems are excellent**, but every once in a while something special comes along. Supra's SupraSonic 288 V+ is in that category. A smallish (and somewhat homely) little modem, it has four features that are ultra cool—besides speed. (**Modem makers take note.**) The first is an on/off push button **in front** of the modem. One of the reasons you buy an external modem is so that you can turn it off in an emergency situation such as a system lock-up. On most modems, the switch is hidden in the back. The second cool thing is an excellent LCD front panel with **detailed readouts**. I was a fan of the old ZyXEL U-1496, because it introduced this concept. The SupraSonic display tells you the transmission speed, connection type, receive speed (sometimes different from the transmission speed with a v.34 modem), and error correction and compression modes. This information is sorely needed with the flaky connections we sometimes get. The modem also reads call-waiting data and displays it and can serve as a front end to a voice mail system. Very cool. Look for it in stores for about \$250 (<http://www.supra.com>).

Fascinating Study Dept.: A British psychologist says the conventional wisdom that young people latch onto computers while older folks tend to shy away from them is **dead wrong**. Nicholas Bozionelos of Scotland's Strathclyde University says he compared a group of 18- to 23-year-olds with a group of 30- to 43-year-olds and found that the older group showed **less anxiety** about computer technology. This study should be expanded to include even older folks and much younger folks. Apparently this younger group was developing a lot of negative attitudes about computers for **no known reason**. Maybe it's because they can't find any work. □

O'Hare Airport: 4.3 miles of terminals.

Dallas/Ft. Worth: 4.8 miles.

Denver International: 3.2 miles.

(It occurred to us you might want a lighter notebook.)



Of course, it also occurred to us that you don't want to lose features while losing weight. Thus, the new AcerNote™ Light notebook computer offers a Pentium® processor, full-size keyboard and large 10.4" color screen.



But it still weighs just 5.8 pounds. Which we think you'll appreciate when you're traveling from, say, Dallas to New York. Half the distance of which is covered while walking to the gate.



AcerNote Light
100MHz Pentium Processor

- 10.4" Dual Scan Color Display
- 8MB EDO RAM (40MB Max)
- 810MB Hard Drive
- 5.8 Pounds
- Duracell® NiMH Battery
- 1MB Video DRAM
- 2 Type II/1 Type III PCMCIA Slots
- Large Full-Size Keyboard
- 16-bit Sound Blaster™ Compatible Audio
- Touchpad with Ergonomic Palmrest
- 3-Year Limited Warranty/1-Year Rapid Repair
- Double your RAM to 16MB for only \$299

\$1999

TO ORDER, CALL 1-800-848-ACER
6am-6pm Weekdays, 8am-4pm Saturday Pacific Time

(It also occurred to us you might want other options.)

AcerNote Light
100MHz Pentium Processor

- 10.4" Active Matrix Color Display
- 16MB RAM (40MB Max)
- 810MB Hard Drive
- 5.8 Pounds
- Duracell® NiMH Battery
- 1MB Video DRAM
- 2 Type II/1 Type III PCMCIA Slots
- Large Full-Size Keyboard
- 16-bit Sound Blaster™ Compatible Audio
- Touchpad with Ergonomic Palmrest
- 3-Year Limited Warranty/
1-Year Rapid Repair

\$2499



AcerNote Pro
120MHz Pentium Processor

- 10.4" Dual Scan Color Display
- 16MB RAM (40MB Max)
- 1GB Hard Drive
- 256KB L2 Cache
- 6.5 Pounds
- Dual Battery Operation
(Second Battery Free with Purchase)
- 1MB Video DRAM
- 2 Type II/1 Type III PCMCIA Slots
- 16-bit Sound Blaster™ Compatible Audio
- Touchpad with Ergonomic Palmrest
- 3-Year Limited Warranty/
1-Year Rapid Repair
- **28.8 Modem Included**

\$2999

AcerNote Pro
120MHz Pentium Processor

- 10.4" Active Matrix Color Display
- 24MB RAM (40MB Max)
- 1GB Hard Drive
- 256KB L2 Cache
- 6.5 Pounds
- Dual Battery Operation
(Second Battery Free with Purchase)
- 1MB Video DRAM
- 2 Type II/1 Type III PCMCIA Slots
- 16-bit Sound Blaster™ Compatible Audio
- Touchpad with Ergonomic Palmrest
- 3-Year Limited Warranty/
1-Year Rapid Repair
- **14.4 Modem Included**

\$3499

AcerNote Pro
120MHz Pentium Processor

- 10.4" Active Matrix Color or Dual Scan Color Display
- 40MB RAM (40MB Max)
- 1GB Hard Drive
- 256KB L2 Cache
- 6.5 Pounds
- Dual Battery Operation
(Second Battery Free with Purchase)
- 1MB Video DRAM
- 2 Type II/1 Type III PCMCIA Slots
- 16-bit Sound Blaster™ Compatible Audio
- Touchpad with Ergonomic Palmrest
- 3-Year Limited Warranty/
1-Year Rapid Repair
- **28.8 Modem Included**

\$3999



AcerDock™
Docking Station

- 200-Watt Power Supply
- Quad-Speed CD-ROM Drive
- 2-button Mouse
- Stand-alone Speakers
- Standard Keyboard
- 3 ISA Expansion Ports/
3 Storage Bays
- Removable Cover for External CRT
- Built-in Battery Charger Bay

\$799

Acer 



TO ORDER, CALL 1-800-848-ACER
6am-6pm Weekdays, 8am-4pm Saturday Pacific Time

Please call 1-800-848-ACER for details on the limited warranty. Return shipping and insurance charges are the responsibility of the customer. Not available outside U.S. Products, availability, prices and programs are subject to change or cancellation without notice. Shipping and handling charges are extra. Acer and the Acer logo are registered trademarks and AcerDock and AcerNote are trademarks of Acer America Corporation and Acer Inc. The Intel Inside logo and Pentium are registered trademarks of Intel Corporation. All other brands and product names are trademarks or registered trademarks of their respective companies. © 1996 Acer America Corporation.

CIRCLE 087 ON READER SERVICE CARD

Underestimating the Need for Power

Oops. We're about to do it again. And it isn't a pretty sight. We've done it before—nearly every time we've had the chance, as I recall—and I'm afraid we're going to put our foot in it once more. Misunderstand the appropriate application of new

levels of computing power, I mean. Maybe not you, but me and my compatriots in The Pundits League. We did it with the 386, then the 486, and then the 586 (a.k.a. Pentium). And now we're doing it again with the 686 (Pentium Pro) and, especially, with multiprocessor PCs.

When each first appeared, the trade press was filled with assurances that this new technology was so fast and powerful that it wasn't really appropriate for desktops, but only for servers. That's where the power of the (choose one) 386, 486, Pentium, or Pentium Pro CPU was really needed, and that was where it would be deployed for some time to come. No mortal user really needed, or could likely even put to use, such awesome firepower at his or her own PC.

It was, of course, balderdash. We meant it when we wrote it; it seemed likely and was written in good faith; and, of course, we were completely wrong, as time quickly proved. It turns out that individual users have a nearly infinite capacity to absorb computing power, aided and abetted by programmers who write the kind of power-hungry apps being released now for Windows 95 and NT. (Of course it was wrongheaded from the other side of the equation, too. While users can and maybe should grab all the CPU horsepower they can get, NetWare servers are almost always I/O bound, not limited by their CPUs' power or speed. So moving to newer and faster processors in servers produces little or no gain. Since "server" and "NetWare" were nearly synonymous in the PC world for the past decade, we got that wrong, too.)

Anyway, these thoughts are stirred by my nonstop pleasure in using one of the PCs that has lately found its way into my office. For the past couple of months I've been doing some of my work on a new Hewlett-Packard Vectra XU 6/200, loaded—I use the term intentionally—with two 200-MHz Pentium Pro CPUs.

To say that it is fast is to miss the point. It is so fast that it's changing my work habits. The jobs that I used to launch and then turn away to do something else, or walk

down the hall for coffee, are now finished so quickly that I don't have time for those little breaks. And things I'm used to seeing happen in 4 or 5 seconds—a blink of an eye in human terms, but a relative eternity in the mind of the computer user—now happen so quickly that trying to time them, for comparative or evaluative purposes, is futile. Everything has become interactive. My work is truly iterative again.

The HP box is running Windows NT. It's my only choice, since I want multiprocessor support combined with 32-bit Windows-app support, and as I've written here before, I like NT, so that's no sacrifice. But NT, at least at this point, is no speed demon, so the XU 6/200's performance is all the more impressive.

So my friends and colleagues, when they wander through and hear me rave about the benefits of dual processors and 200-MHz speed, must smile knowingly, noting how much they like that kind of performance, too. Right? Not a chance.

"But you know," one said last week, "that's highly unrealistic. Multiprocessing is fine. But for another few years, dual processors are strictly a server proposition. No one's going to have dual-processor boxes at their desks. They're too expensive. You have operating-system limitations. And of course, individual users really don't need that much power."

He actually said that. That we don't need that much power.

I asked him if he knew the name Santayana. Or his wonderful line, "Those who cannot remember the past are condemned to repeat it." It captures perfectly the fate of those who keep looking through the wrong end of the telescope.

Thus my little heresy: I think multiprocessor PCs are going to become, if not commonplace, hardly rarities on individual power users' desks by the end of this year. And another: In 1997 and 1998, the idea of a multiprocessor desktop machine will be a no-brainer for power users. One more: I think progress in clustering—organizing several connected PCs to share processing tasks as if they were a



THIRST FOR POWER

Individual users have a nearly infinite capacity to absorb computing power.

BEWARE OF THOSE WEARING BEARINGS!

Our CPU coolers last 10X longer than cheap imitations!



Typical Cooler

- Thick, kludgy design (.8")
- Ordinary extruded heat sink
- Sleeve-bearing fan (10,000 hrs.)
- Made in Taiwan



CPU-Cool

- Thin, integrated design (.5")
- Patented die-cast heat sink
- Ball-bearing fan (100,000 hrs.)
- Made in USA (5-year warranty)

When you consider the likelihood of premature failure, cheap CPU coolers are no bargain. As their thin-film fan-bearing lubricant dries up, you're left with an irritating noise, higher CPU temperature, and the cost and hassle of replacement. So, protect our 486 and Pentium processors the right way! Use only genuine CPU-Cool™ coolers.

CPU-Cool 1.9 (486s & 75-166 MHz Pentiums)\$22
CPU-Cool 2.3 (60-66 MHz Pentiums)\$25
CPU-Cool 3.2 (Pentium Pros)\$29



CPU-Cool 3.2

11th Year **PC POWER & COOLING, INC.** 1985-1996
 5995 Avenida Encinas, Carlsbad, CA 92008, (619) 931-5700, (800) 722-6555, Fax (619) 931-6988
We accept Visa, MC, COO, or PO on approved credit. CPU-Cool is a trademark of PC Power & Cooling, Inc. Pentium is a trademark of Intel Corp.

CIRCLE 080 ON READER SERVICE CARD

JIM SEYMOUR

single machine—will make so much progress this year and next that clustering of multiprocessor machines, rather than single-machine multiprocessing, will be the really big idea for high-powered small-machine computing.

Right now, multiprocessor PCs are expensive. And until Intel got the kinks out of its support chips, going beyond two processors was asking for trouble. But Intel says the upward-scalability problems are solved now (and word from PC vendors' design shops confirms that), and chips get cheap awfully fast these days. A year from now, putting two or more processors into a single user's machine will seem about as extravagant as putting gigabyte-plus hard drives seemed last year. Which is to say, we'll do it and be glad we did.

If this sounds nutty when you've just signed off on a fleet of new 75-MHz or 90-MHz Pentium "office-automation" PCs for your company—nice, cheap, stable machines that you can easily justify putting on almost anyone's desk, yet a big step up from your old 386s and 486s—bear with me. Because over the past three or four years, as "standard" PCs have gotten a lot faster than they once were, we've begun to lose the useful concept of the power user. In many companies I work with, there's been a relative levelling of desktop computing power—a dumbing down of the machines put on the desks of leading-edge users, on the mistaken assumption that they don't really need much more power than, say, their casual-PC-using coworkers.

Wrong, wrong, wrong. Some PC jobs—high-value work, usually performed by well-paid, hard-to-find people—are still very much power-bound; for these people, \$10,000 multiprocessor Pentium Pro systems already make a lot of sense.

Often, when I recommend new, powerful, relatively expensive tools, a few readers write to say I can't see the forest for the trees: Most people—you see it coming, don't you?—don't need that much power. True enough; most people don't.

But if you're one of those who do need all the processing power they can get—if you are, you know it—you'll revel in the performance of these boxes, of which HP's XU 6/200 is the early leader by a substantial margin.

Don't let anybody tell you multiprocessing and 200-MHz CPUs are crazy for desktop machines. We've been down that path before. And it just ain't so. □



"Surely...we have a better option than these!"

Yes, you do.

Turn your excess inventory into a tax break and help send needy kids to college.

Call for your free guide to learn how donating your slow moving inventory can mean a generous TAX WRITE OFF for your company.

Call (708) 690-0010

EAL

P. O. Box 3021
 Glen Ellyn, IL 60138
 Fax (708) 690-0565

Excess inventory today....student opportunity tomorrow

The Forces Behind Convergence

Fifteen years ago, when I was a newspaper editor and after-hours electronics hobbyist, I decided it would make sense to get a personal computer. My plan was to use it for a handful of what we now consider simple tasks: to keep a contacts list at

work, type reports and letters, collate recipes, and store for all time my database of jokes. And I thought I might somehow be able to create low-res electronic contact sheets from my 2,500 rolls of black-and-white negatives. But one possibility that did not occur to me way back in 1981 was that I might be able to use a PC to store, edit, or retouch photographs. That just goes to show how difficult it can be to foresee revolutionary changes.

Similarly, it was difficult to conceive that the PC might be used someday to store, edit, and play back 8-mm home movies or their successor, the then-new Beta and VHS videotapes. One medium was digital, the other analog, and the two technologies didn't mix. Finally, this is about to change. By year's end, you'll be able to transfer and edit videotapes on your PC, and the image quality won't suffer in the least.

What you'll need is a digital video camera with an IEEE 1394 (Firewire) interface and a PCI-bus 1394 adapter card. Prices are high, but they'll come down. Digital video cameras with 1394 from Sony list for \$3,000 to \$4,000, but prices should fall below \$2,000. Expect a 1394 adapter card to cost \$300 to \$500 this year. Finally, don't forget a big hard disk. The digital video compression (DVC) common to all these cameras outputs to your PC at 3.5 MBps. All this sounds pricey, and it is. Just be patient. Wait two more years and digital imaging technology will be relatively affordable.

Digital imaging is just one of the promising developments behind the steady convergence of PC and video technologies. Here are some of the other technologies and applications fueling this convergence:

- **DVD.** Originally the acronym stood for digital video disk. Now it stands for nothing, but the high-density, CD-size disk format can store audio, superb video, or 5 to 9GB of data for use with your TV, stereo, or PC.
- **MPEG-2.** This is the digital decompression method used already on the direct broadcast satellites (DBS) from RCA and Sony that give you better-than-laserdisc quality TV. DVD players will use the same video compression

method. And I believe MPEG-2 will be the tool of choice for video playback on PCs once the price of the decoding hardware drops below \$100. It's possible that Intel's P55C Pentium processors, due at year's end, will have enough horsepower to decode MPEG-2 unassisted.



PC PRODUCTIONS

Wait two more years and digital imaging technology will be relatively affordable.

- **Cyberspace via outer space.** Some satellite transmission receiver/decoders have serial ports on the back and give you the ability to receive data from satellites. Imagine if Microsoft could beam Windows bug fixes to you at 400 Kbps as you sleep. Or if you could use your standard modem line to request Web pages and get them downloaded via satellite.

- **Cyberspace via cable TV.** By the time ISDN finally gets its act together, it may not be fast enough. Cable modems that use the existing cable TV wiring could be the answer, although you may blanch at the thought of relying on your cable TV company to deliver a reliable 10-Mbps Internet signal.

- **PC/TVs.** Gateway 2000, Mitsubishi, start-up NetTV, and Thomson, among others, are marrying big-screen VGA monitors with TV-tuner-equipped PCs.

- **The \$500 Internet appliance.** I have my doubts about its viability, but if it happens, it's going to be using a TV for its display.

- **On-board TV tuners.** For \$100, you can add a TV tuner to your existing PC, and the quality is surprisingly good compared with some of the earlier efforts.

- **TV video-in and -out jacks.** High-end notebook PCs and a few desktop PCs have

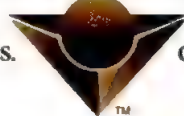
NTSC output jacks so you can use a big-screen TV for your laptop presentation, or input jacks so you can capture images from a video camera or TV set. You can also buy NTSC-out black boxes called scan converters to adapt an existing PC or laptop. By next year, you can expect to see more graphics boards with NTSC-out jacks.

- **PCs controlling stereos.** Sony will offer a product, VisionTouch, that lets you program your CD jukeboxes and other stereo components from your PC.

It's interesting to note that these technologies will be driven more by potential home uses than by business applications. That in itself is a big shift in the industry. □



Larger files. Overcrowded hard drives. Piles of diskettes. Sound familiar? Now you can reliably meet your high capacity storage needs. Introducing the 3M brand LS-120 laser servo 120 MB diskette, the next standard in diskette technology. It works like the diskettes you're using now. Only it's faster and it holds more. Up to five times faster and holds 80 times more. Multi-media presentations. Downloaded Internet files. Large database files.



What's more, new LS-120 drives also read and write your current diskettes up to three times faster. No wonder more businesses protect important information on 3M brand data storage products than on any other brand. Look for the new LS-120 drives built into new Compaq PCs or available as an option. For information call 1-800-888-1889, ext. 4001, e-mail us at datastorage@mmm.com, or visit our Web site at www.mmm.com/datastorage.

The reasons
for our new
120 MB diskette
just keep
stacking up.



3M Innovation

CIRCLE 127 ON READER SERVICE CARD

"OF THE THREE PROGRAMS TESTED ONLY UNINSTALLER DID NOT OFFER TO REMOVE CRUCIAL WINDOWS FILES."

— PC MAGAZINE ONLINE, FEB. 26, 1996

(After reviewing UnInstaller™, CleanSweep® and Remove-It!®)

Only UnInstaller™ from MicroHelp gives you absolute peace of mind to safely clean-up your hard drive. With its exclusive SmartLinks™ technology, UnInstaller performs an intelligent series of scans on your hard drive until it thoroughly understands the inter-relationships of files and programs. Without this technology, even an experienced user may find it easy to accidentally remove a crucial file.



Despite popular belief, Windows 95 applications aren't very thorough at automatically removing themselves from your hard drive. Regardless of which version of Windows you use, you need UnInstaller to continually clean things up. UnInstaller Works with both 16-bit and 32-bit applications.



It's what you don't see on your hard drive that causes problems. Every application puts bits and pieces of itself in places you don't know about. Without UnInstaller, things can slow down — or come to a screeching halt.

And, as an added safety net, UnInstaller automatically compresses and backs-up everything it removes. So, as you clean off bits and pieces of old files, you can take comfort in being able to put things back exactly as they were with the simple click of a button.

Of course, with other deletion programs you can have the experience of getting rid of things you never meant to get rid of. Which may be good for us, but bad for you.



Why take your chances with just any old clean-up program? UnInstaller is the No. 1-selling Windows utility on the market with more than a million copies sold.



1-800-922-3383

Available at your local software store.
MicroHelp is at www.microhelp.com

CIRCLE 214 ON READER SERVICE CARD

© 1996 MicroHelp, Inc. All rights reserved. UnInstaller, PowerDesk and SmartLinks are trademarks of MicroHelp, Inc. All other trademarks are properties of their respective owners. Windows is a registered trademark of Microsoft.

PowerDesk, the highly acclaimed file management and desktop enhancement utility that truly unleashes the hidden power of Windows 95, is also a MicroHelp product.



MicroHelp

HEY, EVERYONE CAN USE A LITTLE HELP.

The
ultimate
computing
resource
online



<http://www.zdnet.com>

From the
sources you trust:

PC Magazine

PC Week

PC Computing

Computer Shopper

Windows Sources

MacUser

MacWEEK

Inter@ctive Week

Computer Life

FamilyPC

Computer Gaming World

Yahoo! Internet Life

Be sure to
sign up for
Personal View

ZD Net's FREE
news service that
you can easily
configure to track
only the companies
and products that
interest you most.

Click into
ZD Net's world-
renowned
**Shareware
Library
and start
downloading!**

Over 10,000
programs —
all tested, rated
and reviewed by
ZD Net editors.

Join in!
**There's a lot
going on —**
from wide-ranging
discussions with
industry leaders,
to topical weekly
chats with editors
and ZD Net
personalities —
there's always some-
thing new, exciting
and insightful
happening at
www.zdnet.com.

**See You
Online!**



Everything you're looking for in PCs

You might not think of Unisys as a place to find state-of-the-art PCs for your company. But all that's changed with *Aquanta*™ PCs and servers. This new product line matches—and even surpasses—the best the PC world has to offer.

Aquanta means quality, with rigorous testing that ensures mainframe-class dependability for mission-critical applications.

Aquanta means performance, with one of the industry's most powerful and scalable product lines—including multiprocessor Pentium and Pentium Pro models, SMP servers and fault-resilient servers.

Aquanta means compatibility, with support for all major operating systems and networks to simplify client/server computing.



© 1996 Unisys Corporation. Aquanta is a trademark of Unisys Corporation. The Intel Inside Logo, Pentium and Pentium Pro are registered trademarks of Intel Corporation.

From a place you probably didn't look.

Aquanta means support, through Unisys worldwide experience implementing technology across departments, companies and countries.

And finally, *Aquanta* means this: While we may not be the first place you look for PCs, we just might be the last.

<http://www.unisys.com/adv> or 1-800-874-8647, ext. 244

UNISYS

The Information Management Company

ONLINE SERVICES

ADAPTING TO

By Rick Ayre and Thomas Mace

The last time we looked at online services, just over a year ago, the quality of Internet access was already an important part of our evaluation. Today, the Internet explosion leads us to pose a much more basic question: Can online services still justify their existence in an Internet-enabled world? Put another way, is your money well spent on an online service or will an account with a basic Internet service provider (ISP) give you everything you need?

After testing the four major online contenders—America Online (AOL), CompuServe, Prodigy, and The Microsoft Network (MSN)—and a fifth startup, the brand-new WOW! from CompuServe, we conclude that the strongest online services still offer a compelling case. We also found them radically changed and in many ways more interesting than a year ago.

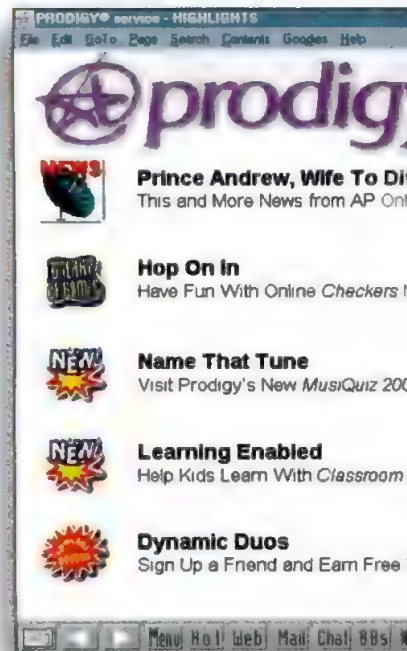
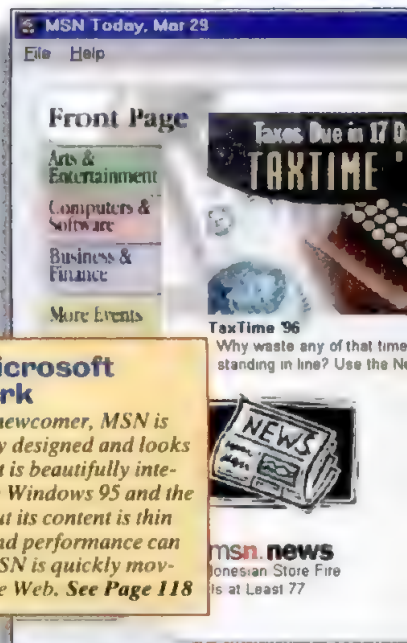
Instead of competing with the Internet—a losing proposition if ever there was one—the most successful services have found ways to repackage it, bring order to its inherent chaos, and extend it with proprietary content and improved features. The result is a value-added proposition that can justify these services' modestly higher costs over conventional ISPs. For those who prefer the Internet in all its rawness, many online services are also offering basic ISP-style access as an alternative (for a look at the pricing schemes of the online services and their ISP divisions, see the sidebar "Online Services: Comparing the Costs").

The Microsoft Network

A relative newcomer, MSN is intelligently designed and looks fabulous. It is beautifully integrated with Windows 95 and the Internet, but its content is thin in places and performance can be slow. MSN is quickly moving onto the Web. See Page 118

America Online

A dazzling interface, strong content, solid infrastructure, and powerful Internet access have made AOL the most popular service—and one of the best. Can 5 million users be wrong? See Page 103



THE WEB

Rather than fight a losing battle, online services have embraced the Internet. For users, it's an ideal match.

Click to go to an area

msn.TODAY

2 DAYS LEFT

Only two days left to save almost 33% on your MSN Membership!

Thanks A Million!

MSN has hit One Million Members in seven months!

Click here for **Free Microsoft Office Tips**

New

NEW MSN Extension 95

Virtual Forum (All graphical chat!)

Featured

America's Talking

American Traveling

Atlanta's Software

China's Money Page

Web's P

Prods, Inds

Deloitte & Touche

Online

CompuServe Information Manager

File Edit Services Mail Special Window Help

Connected 0:59

click here **Explore CompuServe** Member Services Tools & Events

Explore CompuServe

What's New

Find a Topic

Find a File

Find a Member

Member Services

Conference Schedule

Specials & Offers

Computing Support Directory

Internet Spotlight CompuServe

CompuServe

The most information-rich service of them all hides behind this stodgy interface. If you need depth and breadth, it's worth wrestling with CompuServe's many quirks. See Page 114

Welcome to the CompuServe Information Service

Prodigy

Once a leader, Prodigy has lost much of its shine. It still does a good job with member interaction and basic Web access but its content, interface, and infrastructure all need revamping. See Page 130

Home

Communicate

Computing

Entertainment

Family & Family

Internet

Living

Marketplace

Member Help

Money

News & Weather

Reference

Travel

Travel

Main Menu

HOME MAIL HELP BOOKMARK QUIT

CHAT REFERENCE MESSAGING NEWS INTERNET SHOPPING

ENTERTAINMENT LIVING SPORTS MONEY MEMBER SERVICES

WOW!

A new service aimed at the technically challenged home user, CompuServe's WOW! provides ultra-easy navigation, consumer-oriented content, and simple Web access. See Page 140

IN THIS REVIEW

America Online.....	103	SpryNet:	
CompuServe.....	114	The Internet from CompuServe.....	114
The Microsoft Network.....	118	Online Services: Comparing the Costs.....	116
Prodigy.....	130	Shakeouts in the Shadow of the Web.....	120
WOW! from CompuServe.....	140	MSN's Outpost on the Web.....	130
Editors' Choice.....	103	Aavatars and Virtual Worlds:	
The Internet Connection.....	107	The State of the Chat.....	132
Hot Name-Brand Content.....	108	Prodigy's Multiple Web Presences.....	136
AOL's Global Network Navigator.....	112	Summary of Features.....	139

BUILDING ON THE INTERNET

Internet access is a baseline feature for any online service today that hopes to survive. All the services reviewed here give you full access to the World Wide Web and include the browser software needed to view Web pages. Ideally, you want your service to provide a free, state-of-the-art Web browser and other tools such as a news reader, FTP, and telnet clients. You also want a true Winsock connection to the Internet so that you can use any third-party tools you wish.

At the time of our review, only MSN came close to this ideal. But as this story went to press, AOL, CompuServe, and Prodigy were inking deals aimed at securing replacements for their aging browsers. By the time you read this, AOL and CompuServe should be offering Microsoft

Internet Explorer, while Prodigy should offer Netscape Navigator as its default. WOW! will continue to offer its simplified browser based on Microsoft Internet Explorer 2.0 (for a look at the Internet access tools and connection types offered by each service, see the sidebar "The Internet Connection.")

Internet access alone isn't enough. Among the best services, we found a wealth of Web and Internet links integrated into the subject areas where you'd logically seek them. This trivial-sounding feature can be invaluable in the chaotic universe of the Web, even for people who consider themselves experts.

CONTENT AND COMMUNITY

Even with the riches of the Internet, proprietary content remains an important

distinguishing feature that each online service uses to stake out its turf. The offerings run the gamut from CompuServe's unabashed orientation toward computer-industry professionals; through AOL and MSN, whose broad-based content addresses professional, free-time, and family interests; to Prodigy and WOW!, whose offerings will appeal more to nonexpert users, families, and kids.

An online service can also offer a wealth of communications features that help its membership interact. These include secure e-mail, threaded discussion forums, moderated threaded discussions, and live chat facilities. On the cutting edge, CompuServe and MSN offer avatar-based live chat where users move through a virtual 3-D world as animated figures.

While all of these features are available in some form on the Internet, they tend to be far less technically advanced. The Internet versions also lack guides and moderators who can lead discussions and shield members from the free-for-all flaming that characterizes Internet news groups and IRC chat.

CONNECTION CONSIDERATIONS

Even in the age of the Internet, you still need to consider some infrastructure basics when picking an online service (or

ONLINE SERVICES

How to Read the Suitability to Task Boxes

Connecting and navigating We look at software setup, connection configuration, user configuration, and interface quality. We check for the variety of available connection types (modem, ISDN, Internet), high connection speeds, wide local POP availability, and easily locatable access numbers. Can you set up multiple profiles with different access restrictions for a single account? Are billing options clear and can you review account information? Is the UI attractive and does it offer logical, intuitive navigation? Is its performance snappy? Does it display text before graphics and support progressive bitmap rendering?

Community We rate e-mail, group discussion facilities, real-time chat, and 3-D avatar-based chat. Does the e-mail interface make it easy to perform standard mail-management tasks, add attachments, and read and answer mail offline? Is it easy to contact other members? Can you access Internet mail? We looked for

SUITABILITY TO TASK		
Product name	Power	Ease
Connectivity and navigating	Poor	Poor
Community	Fair	Fair
Content	Good	Good
Downloading software	Good	Good
Internet access	Excellent	Excellent

a good selection of special-interest groups, with threaded, easy-to-navigate discussion. Is the real-time chat interface easy to use? Are chat forums lively and is there a good selection of topics? Are unmonitored chat forums and 3-D avatar-based chat offered?

Content How broad and deep are the special interest areas, proprietary libraries, and name-brand third-party content areas? Are premium services offered and is the billing clear? How well is Web-based

content integrated into the service? Do the search facilities let you easily find what you're looking for? Can you buy products or services through this service?

Downloading software How rich are the available software offerings and how powerful are the search facilities? Is the download interface easy to use? Does the client automatically unzip or decode files where necessary?

Internet access We evaluate everything connected with Web and Internet access. We rate the supplied browser software and check whether third-party browsers and other Winsock tools are supported. Do you have full Web and uncensored Newsgroup access? Can you limit Web access by user profile? Can you move seamlessly between the service and the Web? Can you post your own home page and are usable HTML authoring tools provided?

ISP). The two biggest concerns are the availability of local or toll-free numbers for dial-in access and the supported connection speed.

All of the services we reviewed maintain nationwide networks of dial-in access servers or points of presence (POPs), and all provide local-area access numbers. While most cities are well-supported, check that you can access the service without paying long-distance charges if you live off the beaten track.

Your connection speed has a huge impact on the perceived performance of your service and Internet connection. All the services but Prodigy offer 28.8-Kbps access at most of their POPs, the fastest uncompressed speed supported by today's best modems. Prodigy's aging network limits you to 14.4-Kbps connection speeds in many areas.

INEXORABLY TOWARDS THE WEB

Although we found the online services to be alive and well, it's clear that they are moving inexorably towards the Internet. In the most extreme case, MSN told us that it plans to move almost entirely onto a fee-based World Wide Web site by late this summer. All the other services except the fledgling WOW! already have significant Web presences or value-added ISP services that serve as bridgeheads into the new medium (see the sidebars accompanying the main reviews). While we expect the big online services to survive and grow as entities, the era of proprietary interfaces and infrastructures is passing. Those that do not adapt will simply vanish (see the sidebar "Shakeouts in the Shadow of the Web").

In the final analysis, anything you can find on an online service, you can probably find on the Internet too. But while a good online service can offer a clear path to your goal and a wealth of support to go with it, the Internet leaves you on your own. The following reviews will help you decide which approach is best for you.

Our Contributors: RICK AYRE is an executive editor of *PC Magazine*. TOM GIEBEL is a technical associate at *PC Magazine*. PADRAIC BOYLE and SHERYL CANTER are contributing editors of *PC Magazine*. DAVID LIDSKY, MICHAEL MUCHMORE and MELISSA J. PERENSON are staff editors of *PC Magazine*. EYAL RABINOVITCH is an editorial researcher at *PC Magazine*. RICK ROVEGNO is a technical analyst at PC Magazine Labs. THOMAS MACE was the senior editor in charge of this story, and JAY MUNRO was the project leader.

America Online

While rock-solid content, user community, and easy navigation form a vital foundation for any online service, the best will also help you make sense out of a larger, Internet-enabled world. Of today's online services, AOL does the best job of delivering all these things. Its handsome interface makes navigation a pleasure and its content offers plenty for both professional and personal interests. AOL's community features also make it easy to interact with other members in an impressive variety of moderated and unmoderated forums.

With five million users, AOL has the momentum to maintain and extend its impressive roster of content. Its integration of Internet resources is excellent and its aging Internet tools should be updated by the time you read this. AOL's strategies of polishing its usability, refining its content, and making the Internet easier to circumnavigate add up

to an excellent recipe for long-term success.

Honorable mention goes to CompuServe. Its aging, inconsistent interface make it unduly hard to navigate, but its breadth and depth of content are still unrivaled in the online world. The service boasts some 1,300 forums with a dedicated user base from around the world known for active participation. CompuServe is also a Mecca for finding shareware and freeware. Like AOL, it should have state-of-the-art replacements for its current Internet tools by the time you read this. Its integration of Internet resources is uneven, however, and its traditional hold on proprietary content is under threat from Internet services such as the Web and Usenet.



America Online Inc.

America Online



Over five million subscribers have chosen America Online, and for good reasons—a dazzling, easy-to-use graphical interface, a wide choice of content, and full, easy Internet access. This combination has proven enticing to both professionals and hobbyists. Recent deals with Microsoft, Netscape, and Sun to license cutting-edge Internet technology show AOL taking aggressive steps to maintain its lead.

GREAT LOOK, GREAT SUBSTANCE

AOL's graphical interface, with menus made up of single-click art icons, folders,

and other documents, is a best-of-breed design. The total effect is coherent and easy to navigate. Some interface elements are even animated, adding still more visual appeal.

One minor drawback is the necessity of downloading art elements when you enter a new section. This can take several minutes, depending on the number of images and speed of your connection. But to its credit, AOL does not count the time used for these downloads towards your online charges, and when you're embarking on a long art download, there are messages showing approximately how long it will take for popular modem speeds. Once you've got the art, each subsequent visit to a site will be delay-free.

Keywords (like CompuServe's GO words and Prodigy's JumpWords) can take you directly to a subject without requiring you to navigate the menus. The Go To Menu is customizable, letting you add frequently used content or services to the menu bar to expedite navigation. You cannot browse a list of all available keywords as you can in Prodigy, however.



Sun

designed the first **intranet**
back when people thought



Introducing Netra™. The first servers built exclusively for the intranet. The intranet You've heard about it. Now there's a line of servers built exclusively for it. Sun™ Netra servers. More than just black boxes, Netra servers are comprehensive intranet solutions. Solutions that are both simple to deploy and to tailor. Netra CORE 3.0 software lets you tame UNIX® without relinquishing any flexibility or robustness. Solstice™ FireWall-First!™ software provides



server intranet was a typo.

high-grade security. The Java™ Development Kit and Web-authoring tools make you ready to roll as soon as you plug in. And Netra's broad product line and bundled software make it the highest performance, cost-effective deployment platform. Little wonder BYTE, PC Magazine, and LAN Magazine have piled on the awards. That's why it's the choice of intranet professionals. To learn more, contact Sun at <http://www.sun.com> or give us a call at 1-800-786-0785, Ext. 385.



Sun

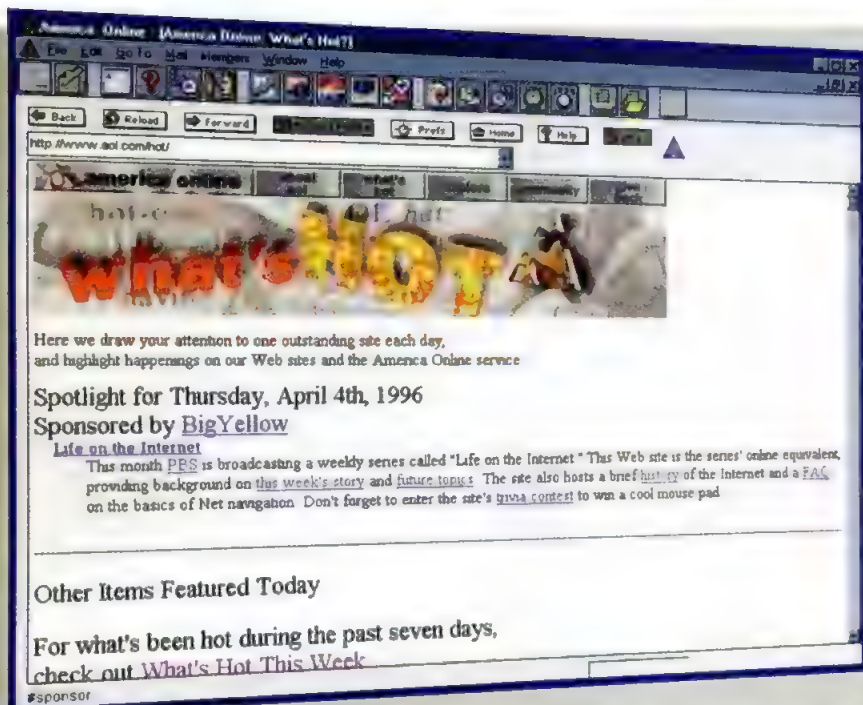
THE NETWORK IS THE COMPUTER

THE INTERNET

By Tom Giebel

Each online service in this roundup provides Internet access and a Web browser as part of the basic package. We found lots of variation in browser quality, access to newsgroups, supplied utilities such as news readers and FTP, and even in connection speeds to the Internet.

Today, only CompuServe, MSN, and WOW! support the use of third-party browsers by default (power users can



America Online The default browser supplied by America Online provides the least attractive Web-page rendering of all the online services. It lacks support for tables, background colors, transparent .GIFs, and other features commonplace elsewhere. Savvy users can download a Winsock to use a different Web browser, but everyone else will have to wait for the ink to dry on AOL's agreement with Microsoft to bundle Internet Explorer as

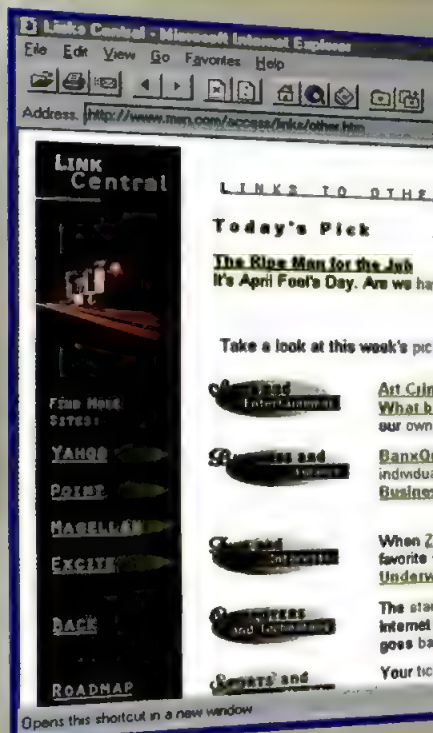
the default browser. AOL does provide a sophisticated news reader and access to all Usenet newsgroups. Members can subscribe to newsgroups and download messages in FlashSessions. The news reader will automatically decode binary files, and will even concatenate files broken up into multiple messages. The service also includes an adequate FTP client and an animated Gopher client. 28.8-Kbps access is widely available.

CompuServe The Spy Mosaic browser supplied by CompuServe is a bit behind the times: its lack of support for tables means many Web pages will look odd. Thankfully you can use any Web browser instead. CompuServe has also recently announced a

deal with Microsoft to make Internet Explorer its future bundled browser. Access numbers for 28.8-Kbps service are widely available.

Accessing a Web site from within CompuServe is

easy: Each topic area under the main menu has a listing of relevant Web sites. The service has made little effort to make its Web listings comprehensive, however. CompuServe currently offers access to all Usenet newsgroups, although its bare-bones news reader makes following message threads next to impossible. It also gives you telnet capabilities and an integrated utility for accessing FTP sites.

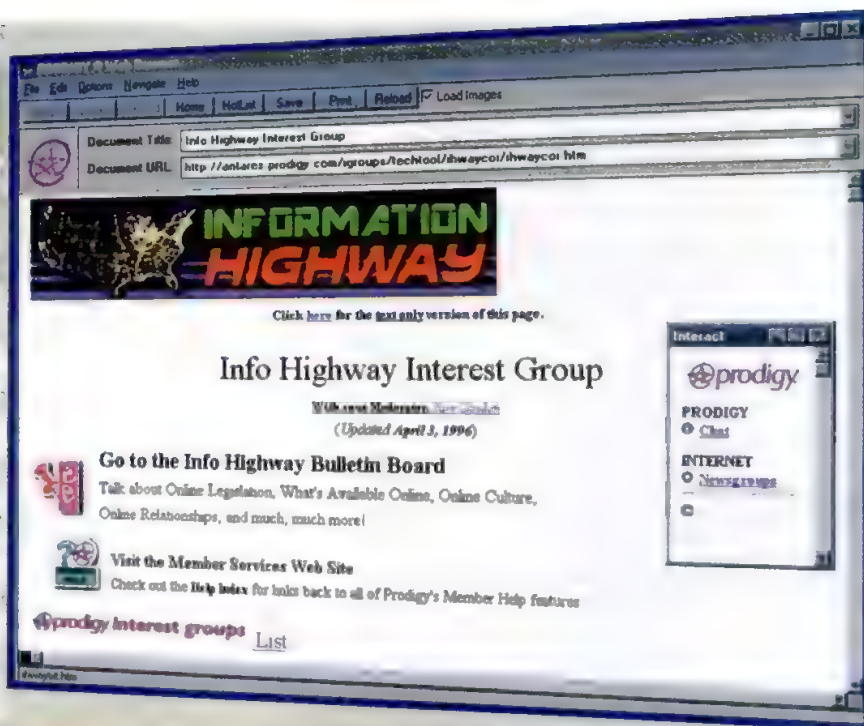


The Microsoft Network Many MSN users will use Microsoft Internet Explorer 2.0 as their default browser although you can use any Winsock-compatible browser instead. Internet Explorer is fast, stable, and easy to use. Version 2.0 lacks some advanced features, but by the time this story appears Internet Explorer 3.0 may be available with state-of-the-art Java, Netscape plug-in, and frame support. Internet Explorer is available as a

CONNECTION

tweak AOL to do this). By the time this story appears, AOL and possibly Prodigy will also let you use any browser you wish. A flurry of recent browser deals will also mean new default browsers for AOL, CompuServe and possibly Prodigy by the time you read this.

The clear trend is away from the many dated browsers we saw in this roundup toward Web-access tools that equal the state of the art.



Prodigy Prodigy offers a fairly sophisticated Web browser which supports most of the advanced formatting features you're likely to see on better-designed Web pages. Tables, backgrounds, transparent GIFs, and client-side image maps are supported. The browser is updated with new features frequently, and can be updated automatically when you log on. Unfortunately, you do not currently have the option of using third-party

browsers or other Winsock applications with your Prodigy account. Your Internet connection speed may be limited to 14.4 Kbps.

Much of the content you'll find on Prodigy is labeled "Prodigy created Web site" and is viewed through the browser. Unfortunately the Web browser closes and re-opens as you jump from site to site. Prodigy offers access to all the Usenet newsgroups,

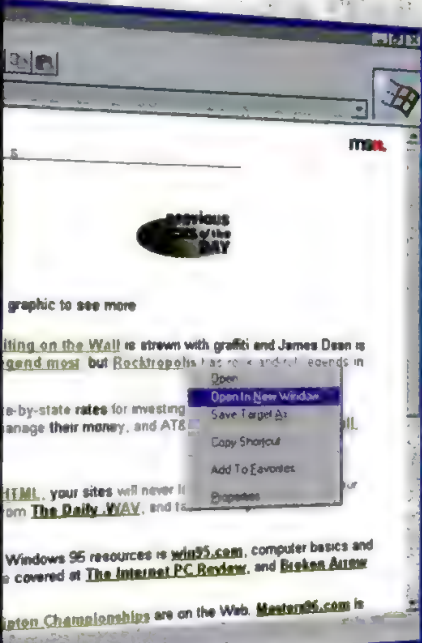
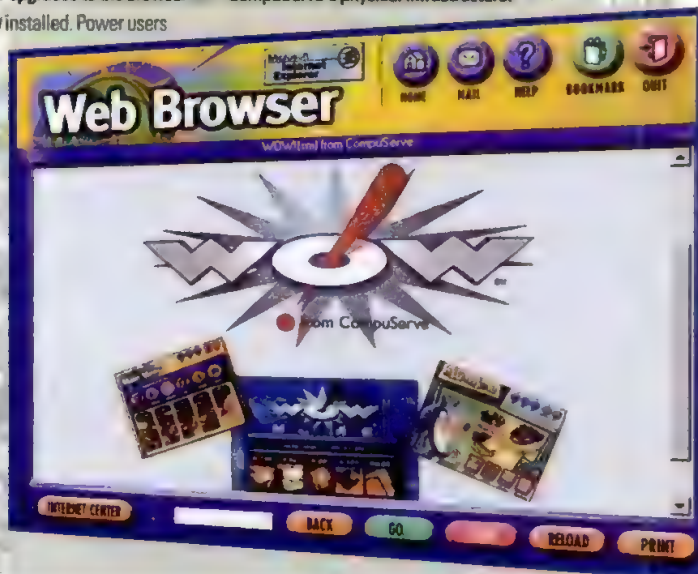
WOW! from CompuServe WOW!'s built-in browser is based on Microsoft Internet Explorer version 2.0, which supports tables, backgrounds, font attributes, and other advanced HTML features but not Java or plug-ins. CompuServe plans to offer upgrades to the browser with selected plug-ins already installed. Power users

Wide Web, it is sometimes unclear whether the pages you are viewing are part of WOW! or the Web. WOW! offers access to FTP sites and Usenet newsgroups only through the Web browser. Internet access is through CompuServe's physical infrastructure.

can add helper applications, but only if the application includes its own install feature. The browser's setup and configuration menus are all hidden from the user.

WOW!'s non-standard interface forces you to view Web pages squeezed into a 640-by-480 window. It also lacks a URL location bar, although you can type in a URL by hitting the Go button.

Because WOW!'s content is so seamlessly connected with the World



free download from MSN and comes preinstalled on many Windows 95 PCs. Your MSN connection gives you Internet access seamlessly. Access numbers for 28.8-Kbps and ISDN access are available in most US cities. MSN provides access to selected newsgroups, but only through the MSN software rather than a true news reader. Your MSN account lets you use Windows 95 or third-party telnet and FTP utilities.

Hot Name-Brand Content *A who's who of branded content on each*

★★★★ EXCELLENT ★★★ GOOD ★★ FAIR ★ POOR
(\$) Additional charges over connect time * Coming soon

America Online

AOL features the best branded content for those who envision the ideal online service as a huge virtual bookstore annexed to a lively café. With offerings ranging from *The New York Times* to *Business Week* to *Scientific American* to Nickelodeon, it lets everyone in the family browse, peruse, channel surf, and chat.

CompuServe

If you have a university research library in mind when you choose an online service, this is the one to select. You'll pay extra for some of the most valuable information here, but no service offers CompuServe's sheer depth, especially on computer-related subjects. Highlights run from 55 daily newspapers to ZD Net.

Microsoft Network

MSN branded-content resources are few but strong. NBC SuperNet features a wealth of news, weather, sports, and NBC entertainment content. You can also access online versions of Microsoft's popular Bookshelf and Encarta. Its business materials are another high point.

Prodigy

Prodigy delivers valuable business resources—but often for additional fees. It offers some attractive kids' areas and solid travel material, but the breadth and depth of branded content are limited. Too many pointers led us to content that is no longer posted.

WOW! from CompuServe

WOW! from CompuServe, brand-new at press time, is still beefing up its roster of branded content. WOW! told us that it will aim to present a few high-quality sources rather than a huge array of choices.

News & Politics

★★★★

ABC News, *Arizona Republic*, *Chicago Tribune*, *Newsweek**, *The New York Times*, *San Jose Mercury News*

★★★★★

AP Online, Magazine Database Plus (\$), News Source USA (\$), Newspaper Archive (\$), Reuters News Pictures, Time, US News & World Report

★★★

American Spectator (\$), C-SPAN, NBC News, The New Republic (\$)

★★★

Access Atlanta (\$), AP Online, Newsday Direct, Tampa Bay Online

★

Reuters, The Weather Channel

Business

★★★★★

Business Week, Crain's Small Business, Hoover's Company Profiles, Inc., Investor's Business Daily, Morningstar Stock & Fund Reports, Motley Fool, PC Financial Network, Worth

★★★★★

Business Database Plus (\$), Dun's Electronic Business Directory (\$), Dun & Bradstreet Online (\$), Entrepreneur, Forbes, Fortune, Hoover's Company Database, Information Please Business Almanac, Money, TRW Business Profiles (\$)

★★★★★

CNBC, Deloitte & Touche Online, Dun & Bradstreet Info Services, Entrepreneur BizLink, Fidelity Online Investor Center, Hoover's Business Resources, Schwab Online, Thomson MarketEdge, TRW Business Info Services

★★★★★

D-B Solutions (\$), Dow Jones News/Retrieval Service, Kiplinger's, Lexis-Nexis for Small Business (\$), PC Financial Network, Strategic Investor, Wall St. Edge (\$)

★

Charles Schwab, Money

Computers

★★★

Dvorak's Software Hardtalk, QUE's Computer & Internet Dictionary, Wired, ZD Net

★★★★★

Advisor Publications, Microsoft Knowledge Base, PC World, Windows Magazine, ZD Net (\$)

★★★★★

NewMedia, PC World, Seidman's Online Advisor, ZD Net

★

ZD Net

★

None

Sports

★★★★★

ABC Sports, Fred Edelstein's Pro Football Report, Pat O'Brien Report, Pro Sports Center by STATS Inc., The Sporting News*, World Wrestling Federation

★★★★★

Information Please Sports Almanac, Sports Illustrated, Ted Nugent Adventure Outdoors

★★★

Golf Digest, Microsoft Complete NBA Basketball Guide, NBC Sports, ShaqOnline, Tennis

★★★★★

AP Sports, Dallas Morning News Sports Day, ESPN Inside Info

★★★

Sports Illustrated, The Sports Network

mented with links to relevant Web sites.

While still not quite as rich in computing resources as CompuServe, AOL is rapidly catching up, and you shouldn't have a problem finding that video driver. Parts of ZD Net have recently been added to the offerings, so now there's lots of shareware to choose from as well.

GREAT COMMUNICATORS

AOL's e-mail facility makes it easy to send mail and binary file attachments to other members or to Internet mail read-

ers that support MIME. You can add mailing lists—not single users—to the address book, but there's no easy way to add addresses from incoming mail. Other useful features, such as folders for organizing messages, are also missing.

The FlashSessions feature minimizes online time by fetching and sending mail in batches (a couple of mail items may take just a few seconds of online time). It also lets you schedule automatic mail retrieval sessions. This function works with subscribed Usenet newsgroups, too.

online service (proprietary content and Web links not included).—By David Lidsky

Entertainment

★★★★

ABC Online, Cartoon Network, Comedy Central, *Entertainment Weekly*, Hollywood Online, MTV Online, Nick at Nite, *Soap Opera Digest*, *SPIN*

★★★★

All-Music Guide, Comedy Central, *Daily Variety*, EDrive, Hollywood Online, *New York*, *People*, Roger Ebert's Movie Reviews, *Rolling Stone*

★★★

BET, Hollywood Online, Microsoft Cinemania Connection, Microsoft Music Central Connection, NBC Super Net, RockNet, *Starlog Entertainment*

★★

American Movie Classics, CBS, HBO, Magill's Survey of Cinema Movie Guide, RockNet, The Sci-Fi Channel

★★★★

Entertainment Weekly, EDrive, *People*, Roger Ebert's Movie Reviews

Home & Family

★★★

Consumer Reports, *Consumer Reports' Complete Drug Reference*, *Family Life*, Food & Drink Network, *Metropolitan Home*, *Parenting*

★★★

The Better Homes Kitchen, Health Database Plus (\$), HomeValue Reports (\$), Peterson's College Guides, Zagat's Restaurant Guides

★

Microsoft Wine Guide Connection

★★

Consumer Reports, Homework Helper (\$), Zagat's Restaurant Guides

★★

AutoCite, *Consumer Reports*, *Good Housekeeping*, *Redbook*

Kids

★★★★

ABC Kidzine, DC Comics for Kids, *Disney Adventures*, Kids' WB, Nickelodeon, Ringling Online

★★★

America's Funniest Home Videos, Frost's Summer Camp Guide, The Snoopy Site, Youth Entertainment Drive

★

None

★★★★

Nickelodeon, Petline Pet Cars Guide, Sesame Street

★★★★

House of Moy, Online Tutor, *Sports Illustrated for Kids*

Science & Culture

★★★★

Atlantic Monthly, Discovery Channel, *The New York Times Arts & Entertainment Guide*, NPR Outreach, *Playbill*, *Scientific American*, *Smithsonian*

★★

Books in Print (\$), Book Review Digest (\$), Knowledge Index (\$)

★★

ArtSpeaks, *Smithsonian*

★★

American Heritage, *Nova*, *Playbill*

★★

National Geographic, *Popular Mechanics*

Reference

★★★

Compton's Encyclopedia, Concise Columbia Encyclopedia, Library of Congress Online, Merriam-Webster Collegiate Dictionary & Thesaurus

★★★★

American Heritage Dictionary, Bettman Archive Forum, Grolier's Academic American Encyclopedia, Hutchinson Encyclopedia, IQuest Info Center (\$), Magellan Geographix Maps, Marquis Who's Who (\$)

★★★

Microsoft Bookshelf, Microsoft Encarta Encyclopedia, Microsoft Encarta World Atlas

★

Compton's Encyclopedia

★★

Grolier's Interactive Encyclopedia, Information Please Almanac, Magellan Geographix Maps

Travel

★★★

AutoVantage (\$), easySabre, Fodor's Worldview, Frommer's City Guides, *Travel & Leisure*, *Travel Holiday*, Travelers Advantage (\$)

★★★★

ABC Worldwide Hotel Guide, easySabre, Hyatt, Larier B&B Guide, National Park Foundation, OAG Travel Service (\$), Travelers Advantage (\$), United Connection, Worldspan Travel Shopper

★

On the Spot Travel Guide

★★★★

CruiseScan, easySabre, Flight Finder, Fodor's WorldView, Mobil Travel Guide, Travelers Advantage (\$)

★

Travelocity

People Connection, where you can engage in live chat with other members, is one of AOL's most popular features. The interface is basic and easy to use. Your account name is used as your "handle," and you land in a lobby when you first enter chat. The chat rooms are easy to identify and are equally easy to join in. Members can create their own public or private rooms and give them custom names. Children's chat rooms are carefully monitored, and members can report inappropriate behavior in any room to a Terms of Service monitor.

Clubs & Interests features message boards hosted by such sponsors as *Road & Track* or *Woman's Day*. The message boards are divided into Categories (the set subjects), Topics (threads started by users), and Postings (the individual messages).

AOL's parental controls offer a lot of help in child-proofing the service. Children are assigned their own subaccounts which parents can limit to prevent access to specific newsgroups and chat rooms. AOL does not list newsgroups known to

contain offensive content. You can access any newsgroup if you know the name, however. For younger children, a predefined option allows parents to easily limit access to the Kids Only section and its related Web sites.

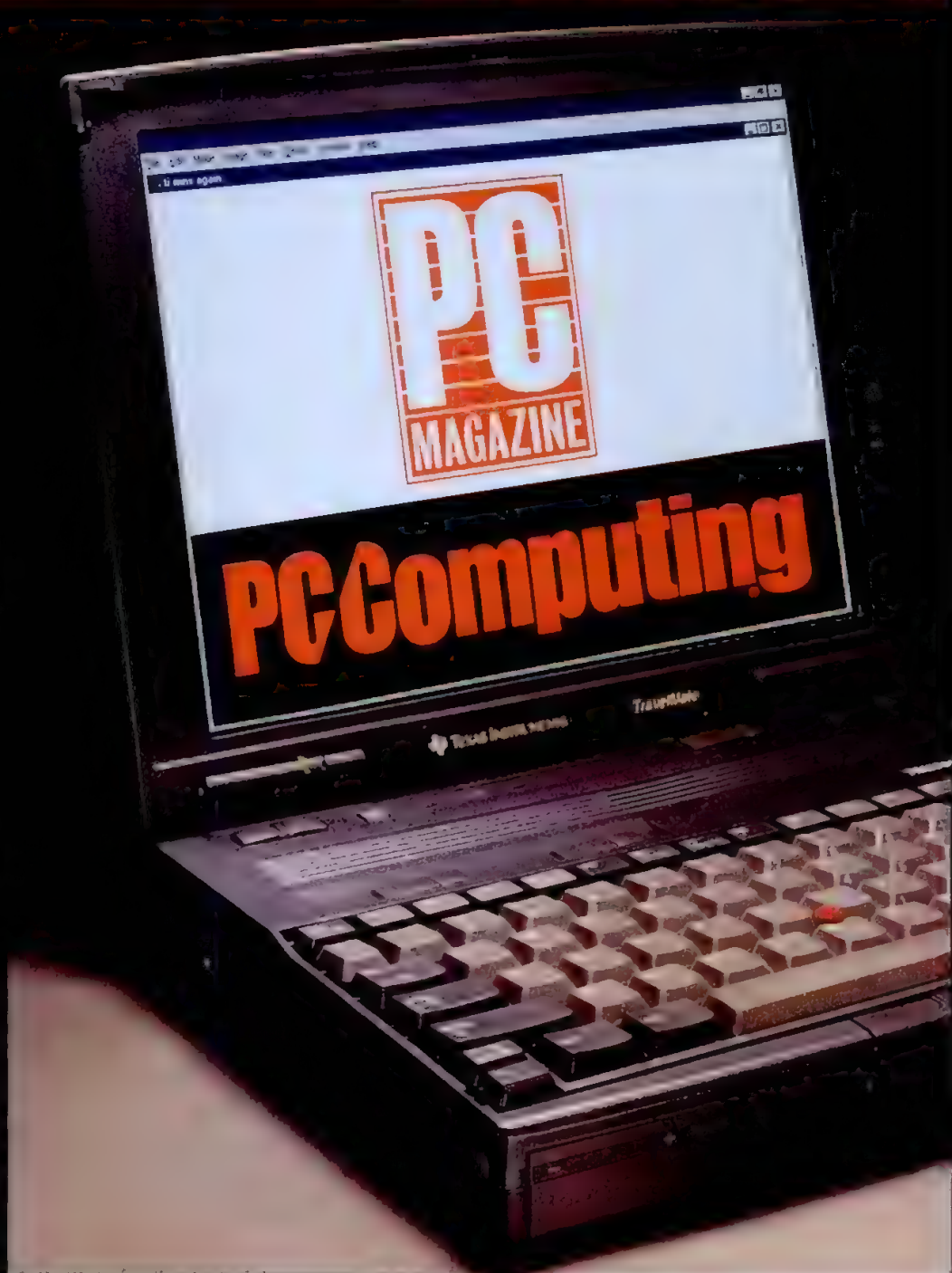
INTERNET ACCESS

The service's Internet features have matured over the past year. AOL recently inked an agreement with Microsoft to distribute its Internet Explorer 3.0 browser. Downloading Navigator and a Winsock

BEFORE YOU BUY, GET

TravelMate 5000 Series

- 133MHz Pentium® processor with PCI bus and 256KB L2 Cache (120MHz and 90MHz also available)
- Brilliant SVGA TFT or VGA TFT Screens*
- 2MB Video memory
- 8MB RAM, upgradeable to 32MB
- Hard Disk Drive: 1.2GB
- Two Lithium ion batteries
- Built-in 16-bit sound, internal speaker and dual mode microphone
- Serial infrared port for wireless connectivity
- Windows® 95 and Windows for Workgroups pre-installed



*Depending on model. TravelMate, DockMate and "Start Doing Extraordinary Things" are trademarks of Texas Instruments. Pentium and the Intel Inside logo are registered trademarks of Intel Corp. Microsoft.

PLENTY OF QUOTES.

"The true standout is
Texas Instruments' TravelMate 5000..."

PC Magazine, August 1995

"The TI TravelMate 5000
will shatter any notion you may
have about notebooks being
too underpowered to compete..."

PC Magazine, August 1995

"...all the way around, the
TravelMate 5000 makes a top-notch
desktop replacement."

PC Computing, August 1995

The performance of the TravelMate™
5000 family has got people talking.
And no wonder. Take our new, 133MHz
TravelMate 5300. It comes
with the maximized Pentium
technology that is only
possible from full PCI bus
architecture. Its battery life is amazing,
even handling the tough jobs like multi-
tasking. The hard drive is an awesome
1.2GB. The video RAM is a full 2MB for
enhanced performance, instead of just
1MB like most competitors'.



And all TravelMate 5000 Series notebooks
come with lithium ion batteries, powerful
Pentium processors, PCI engineering and
support a full range of DockMate™ docking
solutions for maximized productivity. Call
us for a quote. 1-800-TI-TEXAS. And
start doing extraordinary things. Internet:
<http://www.ti.com> E-mail: 2ti@msg.ti.com

Windows and the Windows logo are registered trademarks of Microsoft Corp. ©1996 TI.

 **TEXAS
INSTRUMENTS**

CIRCLE 246 ON READER SERVICE CARD

from AOL (keyword: Winsock) lets you use Netscape or any other Web browser to access the Internet.

AOL also gives you a nice FTP client, a state-of-the-art newsreader, and a Gopher browser. Telnet is available through Netscape Navigator or other telnet clients downloadable through AOL.

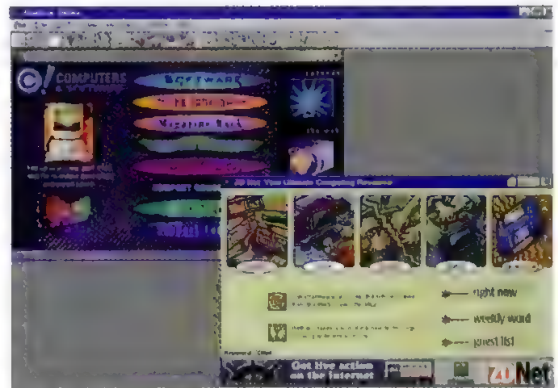
In addition to performing its usual duties, AOL's newsreader automatically downloads, assembles and decodes binary postings from newsgroups. It even eliminates the hassles incurred when large binary files are uuencoded and broken up into several postings.

AOL lets subscribers represent themselves on the Web with personal Web pages and offers two ways to help create them. Nontechnical people can use Per-

sonal Publisher, a basic form for entering personal information. These pages end up in the *home.aol.com* domain. Those who know a little about HTML can upload their files to the server via FTP for use on the *members.aol.com* domain.

INSTALLATION

Setting up AOL was a breeze. Much of the time it takes to configure AOL is merely spent filling out the registration form and downloading the latest software and images. The installation process even attempts to scan your system for connected modems. Once you have registered and the images



AOL's handsome interface offers the best-organized, most user-friendly experience.

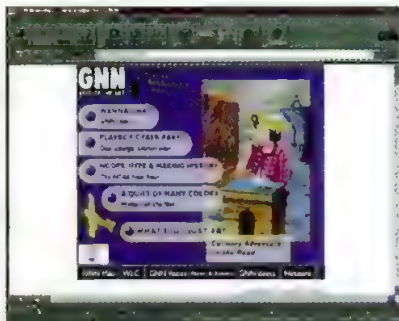
AOL's Global Network Navigator

America Online's subsidiary Internet access provider company, Global Network Navigator, or GNN, is a "nothing but Net" solution (<http://gnn.com>; 800-819-6112). GNN not only gives you 20 hours of Internet access each month for \$14.95 (\$1.95 per each additional hour), but also a wide array of content on its Web site, powerful utilities, and free customer service.

One of the service's more tempting features is its member Web page facility. GNN includes Web-authoring tools and 20MB of server space for publishing your pages. By comparison, a standard SpryNet account permits only up to 5MB on the server.

GNN's Web browser, GNNworks, supports HTML 2.0 and some 3.0 features. It has the usual navigation controls as well as a toolbar which integrates e-mail, newsgroup, chat, gopher, and FTP buttons. The e-mail client is easy to use and supports file attachments via uuencoding or MIME. GNN's newsreader is similarly easy to use and offers split-screen viewing of postings. Both the e-mail and newsreader clients can operate off-line.

GNN's Web site, available to anyone on the Internet, offers much



GNN: Access, a home page, and content.

greater depth of content than most other ISP sites provide.

GNNpress, an OEM version of NaviSoft's Navipress, is the Web-authoring utility that GNN members use to create and publish their own Web pages. Although any third-party Web-authoring tool can be used to create the pages, you still must use GNNpress to load the page onto GNN's server. Currently, GNN does not offer FTP access to the rented space but plans to in the future.

Future GNN plans to lure new members include offering Netscape's Navigator browser and bundling more utilities, such as an Internet phone and a Virtual Places 3-D chat utility.—PB

are downloaded, it's smooth sailing. You can log on via an 800 number to find new local access numbers at any time. Also, you can log on to your account as a guest from any member's computer anywhere in the country.

Dialup connectivity is available using AOLnet (AOL's private network), SprintNET, BBN, or AOL's 800-number access with speeds ranging from 2,400 Bps to 28.8 Kbps. Unlike CompuServe, which limits you to modem speeds even when you connect to the service through the Internet, AOL can run as fast as the fastest Internet connection—a big plus for wired businesses.

A soundly structured online service, AOL is an excellent choice for users of all interests and at all levels of sophistication. Its content is expanding constantly and its integration of material from the Internet is exemplary. Its weak browser is on the verge of retirement and should be replaced by Microsoft's Internet Explorer 3.0 by the time this review appears. With 5 million members under its belt, AOL is clearly the one to beat.—*Padraic Boyle*
America Online. Basic price: \$9.95 monthly for 5 hours, \$2.95 for each additional hour. America Online Inc., Vienna, VA; 800-827-6364, 703-448-8700; <http://www.aol.com/>. Circle 462 on reader service card.

SUITABILITY TO TASK

	America Online	
	Power	Ease
Connectivity and navigating	Excellent	Excellent
Community	Good	Excellent
Content	Excellent	Excellent
Downloading software	Good	Good
Internet access	Good	Good

Now is a particularly good time to buy a Compaq ProLiant
4500 server. (As if there were ever a bad time.) That's
because from now until June 30, Compaq will give you an

BUY ANY QUALIFYING COMPAQ SERVER NOW
AND WE'LL THROW IN AN EXTRA PROCESSOR BOARD.
(Free)

Compaq ProLiant 4500 Tower



additional processor board at no additional cost.*

Depending on the model you buy, that
can mean up to an 80% boost to the server's
performance. And if you decide later to upgrade

to Pentium® Pro technology, you can protect your investment
with our premium-free upgrade program.†

To take advantage of this offer, call your local
reseller today. Or call us at 1-800-410-8458 to locate
the Compaq Reseller nearest you. Buying a ProLiant
server is always a smart decision. Buying one now
could get you a corner office.



Compaq ProLiant 4500 Rack

COMPAQ

Has It Changed Your Life Yet?



©1996 Compaq Computer Corporation. All rights reserved. Compaq registered U.S. Patent and Trademark Office. ProLiant is a registered trademark of Compaq Computer Corporation. The Intel Inside logo, Pentium and Pentium Pro are registered trademarks of Intel Corporation. Offer valid in the U.S. during 1996 only. *Qualifying models are ProLiant 4500 and 4500R 5/100 MHz and 5/133 MHz only. †Applies to all ProLiant 4500R models. Limit one upgrade per server. For more details on this offer call 1-800-410-8458. For more information on our full line of servers, call 1-800-345-1518 or reach us on the Web at www.compaq.com.

CompuServe Inc.

CompuServe

CompuServe is one of the oldest online services and has evolved from a strictly text-mode interface to a graphical one. Its customer base is second only to AOL's and is particularly strong in computer industry professionals. Its computer product support is broader and deeper than on any other service. If you have a question about a product you just bought, odds are there's a support forum for it where you can get questions answered and download drivers or patches. CompuServe also has a variety of other unusual services, everything from the ability to check for registered trademarks to registering a corporation online. Unfortunately, CompuServe's interface is showing its age and its wealth of proprietary content seems increasingly under attack from the Internet.

MANY WAYS TO CONNECT

CompuServe offers two client interface products: CompuServe Information Manager (the Windows version is called WinCIM), and CompuServe Navigator (CSNav). WinCIM provides real-time access to CompuServe and is the way most members will access the service. CSNav provides scripted access: You can download the information you want, read and reply offline, then upload your responses.

While WinCIM lacks the pizzazz of AOL and MSN, the newest release, version 2.0.1, has made some strides toward ease of use. The opening screen gives you one-click access to 12 popular subject areas and the default tool bar at the top of the screen provides 14 icons for quickly accessing standard services such as e-mail, Favorite Places, a find utility, and the Web browser. When you access forums, you'll also see forum-specific button bars for common tasks. Content providers can now offer enhanced menus that give a

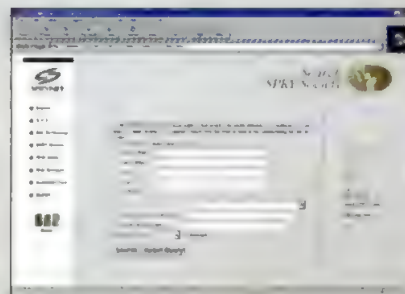
SpryNet: The Internet from CompuServe

If you're more interested in the Web than in CompuServe, you can get straight to the Internet through CompuServe's SpryNet. One of its greatest benefits is the CompuServe Network infrastructure, which SpryNet uses. You'll find local SpryNet access numbers wherever there are local CompuServe numbers. That covers more than 93 percent of the U.S. and 147 different countries. Most of the POPs support modem speeds of 28.8 Kbps. ISDN access is available in most of the U.S. through CompuServe's 800 numbers, which cost \$6 an hour to access.

The SpryNet package is available under three pricing plans. You can pay \$19.95 per month for unlimited access, \$9.95 per month for seven hours with \$1.95 for each additional hour, or \$4.95 for three hours with \$1.95 for each additional hour. SpryNet members can post up to 5MB worth of personal Web pages.

The pricing and the local phone availability are the best things about SpryNet; you will probably not want to use the limited Spry Mosaic Web browser included in the bundle.

If you're using Windows 95, you'll



Find like minds in the SpryNet community.

also have to go through a little pain before you can use 32-bit tools like Netscape Navigator. The SpryNet dialer is a 16-bit program that works only with a 16-bit Winsock so you will have to set up Windows 95's Dial-up Networking for SpryNet instead. Instructions for doing this can be found on SpryNet's threaded message support forum at <http://www.sprynet.com>, a Web site which also includes detailed service information, a search facility, and a collection of useful links.

To register and obtain the free software, call 1-800-777-9638 (Sprynet), or send e-mail to info@sprynet.com. You can also download the software from the SpryNet Web site.—SC

more graphical, easily navigable view of a forum's contents and highlights.

WinCIM's message interface makes it easy to track and participate in threaded discussions. The popular CB live chat facility is short on graphical glitz but CompuServe's new WorldsAway chat, a 3-D world populated by strolling avatars, is one of the best we've seen.

Unfortunately, navigation conventions throughout the service remain fairly inconsistent. The lack of threading in the interface also means that a single task, a download for example, can tie up the program entirely. We were unable to preview CIM 3.0, which CompuServe says should be available this summer.

You can also access CompuServe through third-party tools, some of which are superior to those offered by CompuServe. This is due to its willingness to pro-

vide its interface specification to third-party vendors with a compelling product plan. CompuServe is preparing for a major protocol change to enhance system capacity that will break most third-party access packages. Vendors are racing to update their tools.

TOP-NOTCH CONTENT

CompuServe's interface may need work, but the content it offers is top-notch. Its over 1,300 forums are visited by experts from all over the world. On CompuServe you can find an answer to virtually any question on any topic, no matter how esoteric. CompuServe is also a reasonably civil place, thanks to its membership rules. You won't get flamed as badly as you might on the Internet.

CompuServe is especially strong in its computer vendor forums. Just about every

SUITABILITY TO TASK

CompuServe

	Power	Ease
Connectivity and navigating	Good	Fair
Community	Good	Good
Content	Excellent	Good
Downloading software	Excellent	Excellent
Internet access	Good	Good



Can your word processor do this?



Review incorrect sentences. Exclusive **GrammarCheck™** can, and you specify the style of writing involved.



Make your documents shorter—or longer. Exclusive **Make It Fit™** can, and you control what formatting features are changed.



Find any term in a file on any drive in a hurry. Exclusive **QuickFinder™** can, with world-class speed and efficiency.



E-mail the document you're working on, without leaving WordPerfect®



Not only make up an invoice, but calculate it as well. **Tables** function can—with 98 spreadsheet functions available at a click.



Move a project automatically from application to application within the suite. Exclusive **QuickTasks™** can—and you can choose from more than 60 pre-built QuickTasks™ or make your own.

You use a word processor every day—shouldn't you use **THE BEST?**

THE WORLD'S BEST WORD PROCESSOR IS NOW AN UNBEATABLE OFFICE SUITE.

Office Applications + Graphics Power + Internet Connectivity
at a Word Processor Price!

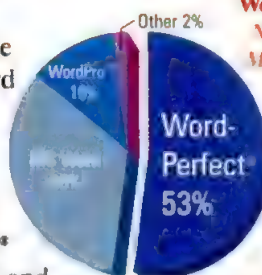
The NEW Corel® WordPerfect® Suite for Windows® 3.1x will bring an unparalleled level of power and value to the world's best word processor. Delivering all the standard office suite features plus powerful graphics and Internet capability, the Corel® WordPerfect® Suite packs so much power and so much value into one CD-ROM it leaps far ahead of Microsoft® Office.



Corel® WordPerfect® Suite for Windows® 3.1x CD-ROM version† includes:

- Corel® WordPerfect® 6.1
- Corel® Quattro® Pro 6.0
- Corel® Presentations™ 3.0
- CorelFLOW™ 2
- Sidekick™ 2.0
- AT&T WorldNet™ Service software including Netscape Navigator™ Internet browser
- Dashboard™ 3.0
- Corel® Screen Saver
- Envoy™ 1.0
- 150 fonts
- 10,000 clipart images

The figures speak for themselves. When people choose a standalone word processor, they choose WordPerfect®. In fact, WordPerfect® has consistently outsold and outperformed Microsoft® Word for Windows® 3.1x and Windows® 95.



WordPerfect® 3.5 for Macintosh® beats Microsoft® Word for Macintosh® for MacUser 1995 Editor's Choice Award.
MacUser, December 1995

WordPerfect® 6.1 for DOS receives Editor's Choice.
PC Magazine, November 1995

WordPerfect® 6.1 beats Microsoft® Word for Windows® 95 for Editor's Choice.
PC Magazine, November 1995



Includes everything in the Corel® WordPerfect® Suite, plus GroupWise™ 4.1 E-mail client license and Paradox® 5.0 database.



The only spreadsheet application that seamlessly uses files from all three major spreadsheet programs: Quattro® Pro, Microsoft® Excel and Lotus 1-2-3®



Easy, powerful presentations in minutes, with sophisticated transitions, sound and more.

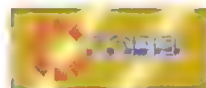
CIRCLE 358 ON READER SERVICE CARD

MicroWAREHOUSE®

1-800-558-4366

Please use source code PCP 0696

*US\$ plus applicable taxes.



<http://www.corel.com>
Call now for faxed literature!
1-613-728-0826 ext. 3080

major hardware and software vendor has a presence on CompuServe. If you use the company name as a GO word, chances are you'll find it immediately. If not, the Computer Support Directory (GO SUPPORT) lets you search by company, product, or keyword, or browse by category. Obtain technical support (or at least a sense of the problems you'll encounter if you buy a product) by reading and posting messages in the forums, and you can download updated drivers and utilities.

CompuServe is also an excellent place to find shareware and freeware. One of the largest shareware collections is in the ZD Net Software Center (GO ZDNET and select Software Forums). There you will find thousands of programs organized into nine categories: applications, arcade, utilities, business, home, education, studio, action games, and Internet. Shareware authors will appreciate the share-

ware registration area on the CompuServe side of the gateway (GO SWREG).

In addition to its forums and libraries, CompuServe has a variety of special surcharged services. For example, a variety of online databases let you search periodical back issues for articles of interest. You also can make airline reservations, obtain stock and commodity prices, check sports scores, and much more. The more you look, the more you'll find.

INTERNET CONSIDERATIONS

CompuServe's default browser, Spry Mosaic 3.0A, gives you basic browsing capabilities and a standard interface but lacks support for now-standard features such as tables. The company's recent deal with Microsoft should make Internet Explorer the default browser by the time you read this. CompuServe's Winsock also supports the use of third-party tools. Your CompuServe

account also gives you full Usenet newsgroup access. CompuServe's newsreader is primitive but its listing of groups by category can help you locate subjects of interest.

If you want to use CompuServe to connect to the Internet and you are using Windows 95, you will have to take some special steps. To connect to the Internet, you need to establish a Winsock connection. Problems arise because the dialer that comes with WinCIM is 16-bit and does not work with the 32-bit Winsock in Windows 95, or with other 32-bit Internet software such as the Windows 95 version of Netscape. You can connect using the WinCIM Winsock, but once it's loaded you cannot use the 32-bit Winsock without rebooting, and 32-bit Internet software won't work. A better solution is to disable the WinCIM Winsock by renaming it in all the directories where it's stored, and use the Windows 95 dialer instead. The Win-

Online Services: Comparing the Costs

Time was when you almost needed an accountant in order to understand the pricing structure of your online services. Thankfully, pricing is now relatively straightforward and the fees show little variation.

With all the services, many options that used to cost extra are now included in your basic connect costs. Given the importance of features and content, you're not going to pick an online ser-

vice based on price alone. But it's worth considering the amount of time you'll spend online or on the Internet, and whether you want to pay for premium services. Your usage patterns may well influence your choice.

AOL, CompuServe, MSN, and Prodigy each cost \$9.95 for five hours of use, but only AOL does not have any additional fee-based content on its service. WOW! can be an attractive

solution for heavy users who need a "lite" service plus Internet access.

If you just want to go on the Internet, the online services' ISPs are an option. You still get some sense of community if you choose GNN or SpryNet, and these services may be more appealing to moderate to heavy Web surfers. Access Net Direct's novel pricing plan could have value for light Internet users.—

David Lidsky and Eyal Rabinovitch

	ONLINE SERVICES					INTERNET SERVICE PROVIDERS		
	America Online	CompuServe	The Microsoft Network	Prodigy	WOW! from CompuServe	Access Net Direct	GNN	SpryNet
■ YES □ NO								
Sign-up offer	15 free hours, first month	10 free hours, first month	None	10 free hours, first month	First 30 days free	None	First 30 days free	3 free hours, first month
Basic fee	\$9.95 per month	\$9.95 per month	\$4.95 per month	\$9.95 per month	\$17.95 per month	Free	\$14.95 per month	\$4.95 per month
Number of hours included per month	5	5	3	5	Unlimited	1	20	3
Price for each additional hour	\$2.95	\$2.95	\$2.50	\$2.95	N/A	\$1	\$1.95	\$1.95
Frequent user plan	None	\$24.95 for 20 hours, \$1.95 each additional hour	\$19.95 for 20 hours, \$1.95 each additional hour	\$30 for 30 hours	None	5 free hours for every \$15 spent	None	\$9.95 for 7 hours, \$1.95 each additional hour, unlimited, \$19.95
Annual fee plan	None	None	\$49.95	None	None	None	None	None
Monthly fee includes premium services	■	□	□	□	■	N/A	N/A	N/A
Internet access	Free	Free	Free	Free	Free	Free	Free	Free
ISDN access	None	Free*	Free	None	Free*	None	None	Free*
Internet mail	Free	Free	Free	Free	Free	Free	Free	Free

N/A—Not applicable: This provider does not offer premium services *Local ISDN access is available in 11 cities only. Nationwide toll-free access is available for a \$6.00-per-hour surcharge.

Introducing
the first PC
worthy enough
to work beside
your trusty
HP printer.



HP Vectra 500 PC



You never give your HP printer a second thought. You just know it's going to work. Now that same HP performance can be found in a line of PCs designed specifically for the demands of small business. The HP Vectra 500 PCs. They arrive ready to work—some armed with Microsoft® Office for Windows® 95 Professional Edition and Microsoft Publisher. And to make everything a little more manageable, HP gives you free online

service and support. Dealers include: Intelligent Electronics, Computerland, Datago, MicroAge, Inacom and CompUSA Corporate. For more information, call 1-800-322-HPPC, Ext. 1559.* And see what a good family name can do for you.



*In Canada, call 1-800-387-3867. *Average U.S. street price for Pentium® processor-based HP Vectra 510 5/75 PC. Monitor not included. HP Vectra 500 PCs come with Microsoft Windows 95 preinstalled. †Standard on 133 and 166 MHz models, optional on all other models. *Other capacities available. †Standard on CD, MC and MCx models. *Multimedia models only. †On-site, second day business service. Microsoft and Windows are U.S. registered trademarks of Microsoft Corporation. Pentium and the Intel Inside logo are U.S. registered trademarks of Intel Corporation. ©1996 Hewlett-Packard Company. PPG428

FROM \$1,269*

Minitower or Desktop models:

- Intel 75, 100, 120, 133, 150 or 166 MHz Pentium processor
- 8 or 16MB EDO Memory (128 MB max)
- 256 KB cache memory†
- 64-bit PCI video
- 1.6G hard drive†
- 4X, 6X or 8X EIDE CD-ROM Drive‡
- 28.8 fax/data modem with telephone answering machine†
- 16-bit Soundblaster audio†
- Hands-free headset with microphone†
- 1 year on-site warranty†
- 1 year free phone support for hardware, 90 day free software support

HP PCs For Small Business



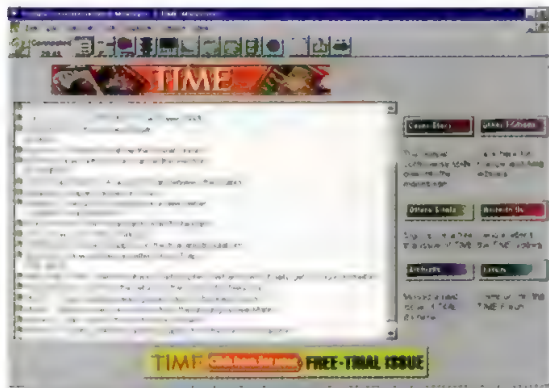
dows Plus pack makes this process much easier with a Dial-up Scripting tool and a preconfigured script for CompuServe. Without this, you would have to establish the PPP connection and enter the login information manually. WinCIM 3.0 will be 32-bit and compatible with Windows 95.

A more serious inconvenience is CompuServe's inability to handle binary mail attachments to and from the Internet. If someone sends you a binary attachment through the Internet gateway, it will come in as an encoded text file, which you must then manually decode with a third party utility such as WinCode.

Corporate users with fast network-based Internet connections can connect to CompuServe via IP but they will be limited to an access speed of about 30 Kbps. CompuServe explained that this is due to a server limitation.

Getting connected to CompuServe can be a bit ungainly, but once connected you can reap the benefits of the most content-rich online service available. An updated 32-bit WinCIM and browser should solve many of the annoyances we encountered by the time this review appears. For the computer novice, CompuServe may not be the best choice. But if you are a professional, especially a computer-industry professional, who needs access to software, drivers, and answers to almost any question, you can't do better.—*Sheryl Canter*

CompuServe. Basic price: \$9.95 monthly for 5 hours, \$2.95 for each additional hour. CompuServe Inc., Columbus, OH; 800-848-8199, 614-529-1221; <http://www.compuserve.com>. Circle 463 on reader service card.



You'll often find CompuServe's best interfaces attached to its big-name sites like Time.

Microsoft Corp.

The Microsoft Network

Just eight months ago, Microsoft launched The Microsoft Network (MSN) to address the professional needs, free-time interests, and family activities of Windows 95 users. Today, with over a million members, MSN boasts seamless Internet access, strong e-mail services, and a robust user-community infrastructure. But sluggish interface performance and gaps in its roster of content detract from the service's advanced design.

Ironically, MSN debuted just as the Web was beginning to revolutionize the entire online service paradigm. By late this summer, Microsoft expects that most MSN content will have migrated to a fee-based Web site.

SLICK BUT SLOW

MSN presents a well-designed, graphically sophisticated face, at least in its premier services. Its opening screen, MSN Today, sports a handsome magazine-like layout. Integrated text, photos, and graphics present highlights of the day's offerings, and a set of tabs lets you quickly access basic content services. Other important sections such as MSN News and NBC SuperNet boast the same slick look.

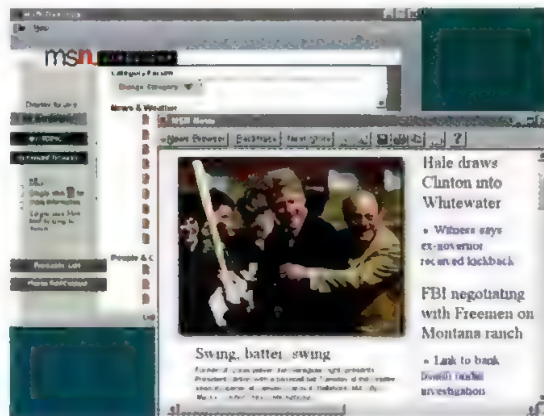
Unfortunately, these high-gloss screens exact a performance penalty. Although text is always displayed before images and bitmaps are painted progressively, the service often needs to finish a lengthy download before a new screen is displayed. Response on anything slower than a 28.8-Kbps modem can be painful. We also experienced considerable disk thrashing on a 16MB test system while screens were being updated. Once you move to specialized subject areas (forums), the MSN interface simplifies. Each area's home is a simple Explorer-style window, and icons represent content elements.

MSN provides a Directory to search for subjects of interest alphabetically or by category. You can also utilize Win-

dows 95's Find utility within MSN and it proves to be a much better tool for quickly locating what you want.

CONTENT

MSN's content is impressive for such a new service, but the depth of options can't compare to AOL and CompuServe. What is there is often of very high quality, though. MSN news is unsurpassed for integrating images and text in a compelling format. Microsoft's recent agreement



MSN's slick interface is graphically rich, but pages can be slow to load.

with NBC has spawned a number of attractive sections within NBC's SuperNet, including election-year coverage, news, weather, business, and sports. MSN's online versions of Microsoft's Bookshelf and Encarta CD-ROMs are an appealing draws for both adults and kids with homework. Not surprisingly, the MSN forums devoted to Microsoft products are excellent sources of information, support, and file downloads. Other computer vendors and computer publications (including *PC Magazine*) are represented, although MSN does not rival CompuServe as a source for computer-related information. We also discovered a dearth of brand-name content, particularly family-oriented material.

Most MSN forums offer the standard fixtures you'll find in other services including threaded discussions, live chat, libraries, and FAQs. Files for downloading are presented in a clear list sortable by subject, author, size, and date. Double-clicking an item on the list brings up a description and a file icon which you double-click to initiate the transfer, which runs in the background while you do other things.



Introducing more kick for your Pentium® processor-based PC.

Upgrade your Pentium® processor-based PC with a Pentium OverDrive® processor.



The new Pentium OverDrive processor is an easy-to-install, single-chip CPU

upgrade that gives you a performance increase of over 50% on a wide range of business software*. Like spreadsheets

and presentation graphics, or operating systems like Windows® 95.

Pentium OverDrive processors are now available for 60, 66, 75, 90, and 100 MHz Pentium processor-based PCs and, as always, for most Intel486™ processor-based PCs. All affordably priced.

So if more performance is your ultimate goal, call your local dealer

or call FaxBack® at 1-800-525-3019, doc. #8739 for pricing and availability information. Or visit our new Web site.

► www.intel.com/procs/ovrdrive

PROUD PARTNER

intel®

I50
14th Anniversary
Smithsonian

© 1996 Intel Corporation. *Based on upgrading a 60-MHz Pentium® processor-based PC with a 120-MHz Pentium OverDrive® processor running a range of 16-bit productivity applications. **All other brand names are trademarks of their respective owners.

POWER MEETINGS

MSN implements threaded discussions, moderated threaded discussions, real-time chat, and e-mail—the four main ways user communities on online services interact—very well. E-mail is one of MSN's biggest strengths. Users can exchange secure mail within the MSN domain and access the wider world of Internet mail. MSN's e-mail uses Windows 95's Microsoft Exchange viewer, one of the best e-mail clients around. We found it extremely easy to create, view, browse, search, organize, sort, and answer mail. You can add binary attachments to messages using drag and drop.

MSN's group communication offerings, which range from sober threaded discussions to real-time 3-D virtual chat,

SUITABILITY TO TASK		
The Microsoft Network		
	Power	Ease
Connectivity and navigating	Good	Good
Community	Good	Excellent
Content	Fair	Excellent
Downloading software	Fair	Excellent
Internet access	Good	Excellent

are broad-based and technically sophisticated. The chat and threaded discussion interfaces make it easy to follow conversations. Real-time chat areas and discussions relating to Microsoft products were well-attended. Other areas were all but deserted. Many forums regularly schedule real-time chats and there are a number of general chat areas as well.

MSN's intriguing avatar-based chats,

which take place in a variety of 3-D virtual worlds, are the closest you'll come to other members. Participants see each other's avatars in the 3-D space that you navigate using arrow keys or your mouse. You strike up conversations as you go, representing yourself as one of MSN's cute stock avatars and expressing yourself with emotions like "shrug" and "flirt." You can download tools to create your own custom avatar.

INTERNET ACCESS

Internet access has always been part of the basic MSN package and Microsoft impressively makes them work together seamlessly. We found a selection of well-chosen Internet links in many MSN sites, especially those where the proprietary

Shakeouts in the Shadow of the Web

In past reviews of online services, we've generally included a sidebar previewing new services that hadn't yet opened their doors to the general public. Today, with more people signing up to go online than ever have before, it's ironic that there are fewer commercial online services than there were just over a year ago.

What's made the difference is the Internet. While the biggest and most robust services can offer convincing value-added packages that embrace the Internet, the smaller services seem to be losing their reason for existence. Here's what happened to some well-established old timers and promising newcomers.

MOVE TO THE WEB OR DIE

AT&T Interchange, a high-tech proprietary service originally developed as Ziff-Davis Interchange and later acquired by AT&T, is a classic case of too little too late. When first announced in 1994, it sounded almost too good to be true. It was an online service platform designed by information publishers to serve sophisticated online information consumers. It was supposed to provide a powerful delivery infrastructure that online services or the Internet simply didn't have.



iguide is the Web site that was once Delphi.

Users could search across every part of the service, including files, forums, and news areas, for topics of interest. They could launch smart agents to keep a lookout for subjects of interest. They could use the service in real time, or batch up their requests to be serviced over night. The look was glossy and graphical.

Sadly, by the time AT&T Interchange opened its doors in June 1995 as platform for various services including AT&T's Business Network, the Internet's open standards rather than any one service's proprietary protocols had prevailed. What's more, most of the delivery technology Interchange envisioned was already available on the Web. In the midst of a series of well-publicized layoffs this past Janu-

ary, AT&T announced that it would take its AT&T Business Network and the Interchange platform onto the Web, effectively killing the service as it had originally been conceived. Today, the AT&T Business Network is a fee-based Web site (<http://www.att.com>).

GENie and Delphi are two other services struggling in the shadow of the Web. It was never clear why users preferred them to CompuServe or America Online, except perhaps for some exclusive content, or because users were inclined to stick with what they knew best.

When we last reviewed online services, Delphi's biggest draw was Internet connectivity, something that is now ubiquitous. Today, iguide on the Web is an extremely handsome site that offers much of what Delphi was meant to be, including news, special interest areas, bulletin boards, and even chat (<http://www.iguide.com/>).

GENie, now in its eleventh year, is a traditional online service in the midst of major restructuring under new ownership. It has moved to integrate Web links into its traditional service and plans to move fully onto the Web. Its Web site (<http://www.genie.com/>) provides both content and details about the service.—Rick Ayre

Only from **South Dakota**

(Prairie dog
shown actual size)



A large, dark-colored PC monitor is the central focus, displaying the Gateway 2000 logo and the word 'DESTINATION' in a stylized, glowing font. To the left, a portion of a keyboard is visible. In the foreground, a large, ergonomic computer mouse with a scroll wheel and several buttons is shown. The overall lighting is dim, with the monitor's display providing the primary light source.

GATEWAY 2000 DESTINATION

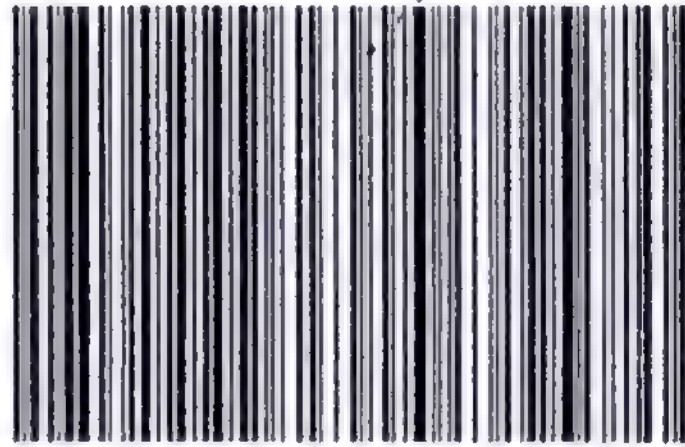
(Gateway's Destination Big Screen PC monitor
shown actual size)

that looks great
ontrol.

1. Follow instructions on the other side

Back

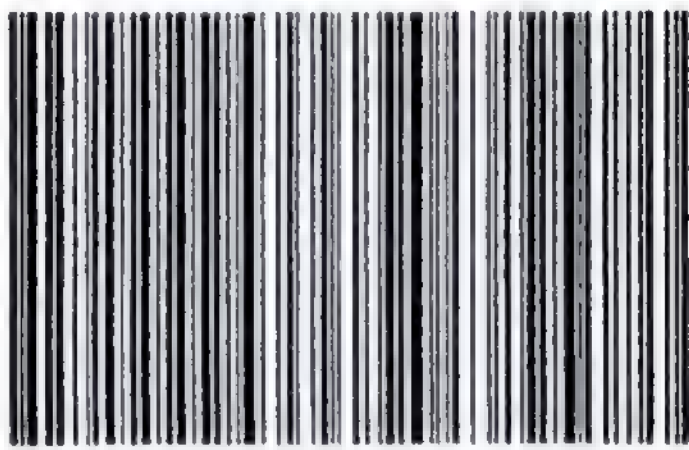
Gbs5lipBack-0018



Inverted Back

1. Follow instructions on the other side

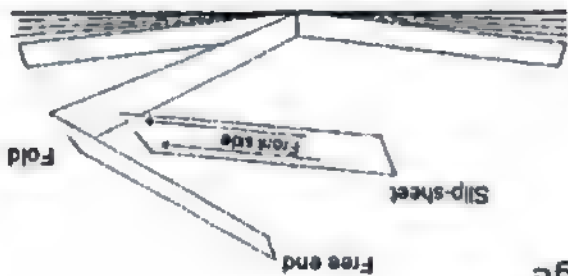
Folded edge of the page



GbsSlipSheet-001

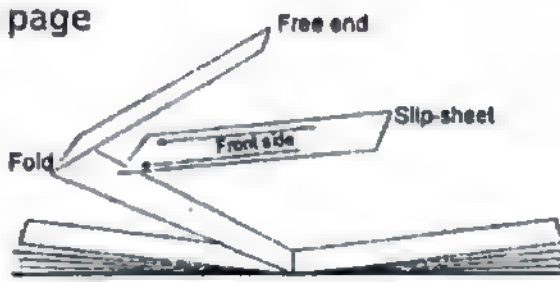
Inverted Foldout slip-sheet

Foldout slip-sheet



1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet

1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet





Gateway 2000 has pioneered a whole new computer category that merges PC with TV.

We call it the Destination Big Screen PC. A group-computing, TV-viewing, multimedia-blasting, Internet-cruising mothership from the couch. Or from anywhere else in the room thanks to the 31-inch monitor, wireless keyboard and Field Mouse™ remote control.

It's all part of Gateway's tradition of bringing value, service and technological leadership to customers first. To find out more about the Destination Big Screen PC and our whole family of desktop and portable PCs, give us a call. We'll give you the big picture.



(Holstein cow
shown actual size)

The leader in desktops & portables
now brings you something **big.**



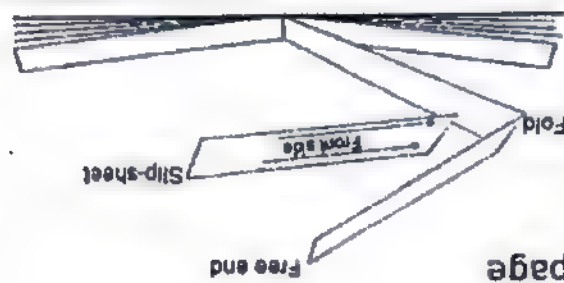
"You've got a friend in the business."®

tion Big Screen PC.
ged the way you look at computers.



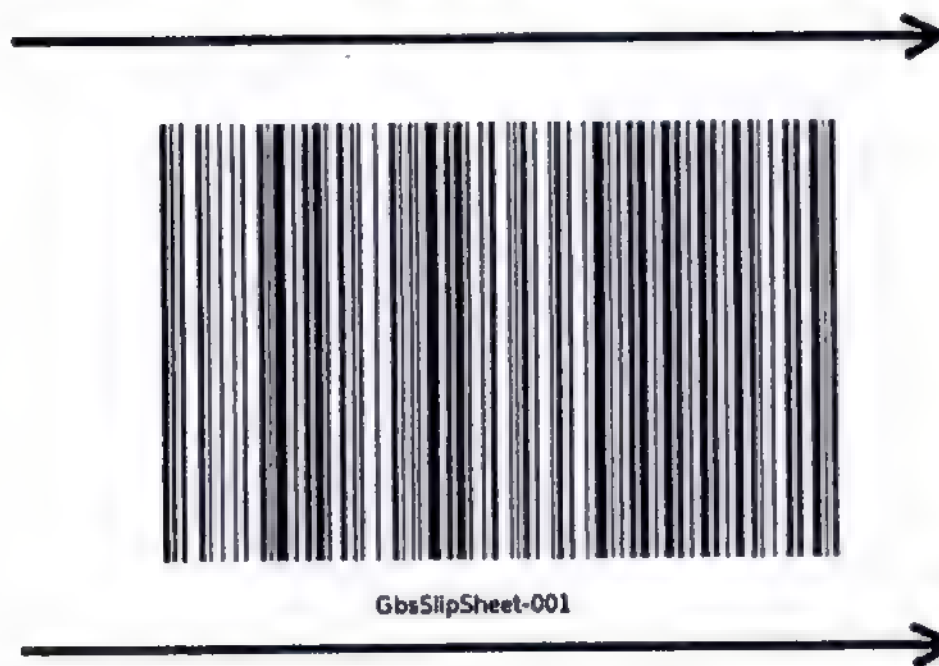
"You've got a friend in the business."®

8 8 8 - 2 0 0 - 0 6 3 1



1. Open the foldout page
2. Insert this sheet with
1. Front side touching the free page
2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet

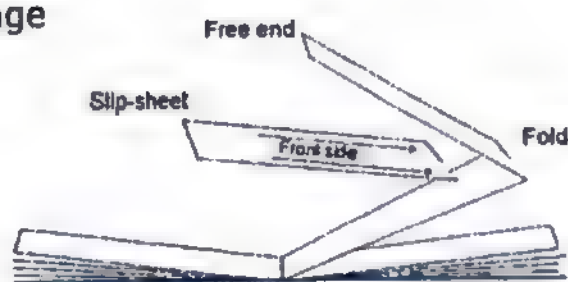
Inverted Foldout slip-sheet



Folded edge of the page

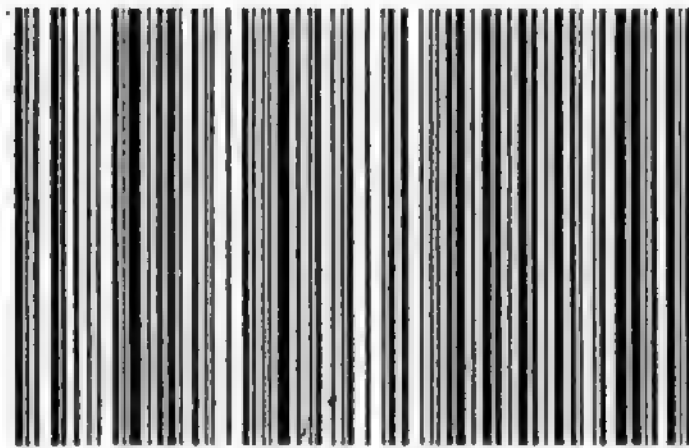
Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



1. Follow instructions on the other side

Inverted Back



Gbs5lpBack-001B

Back

1. Follow instructions on the other side

The Destination
We've changed
Again.



P5-120 FAMILY PC™

- Intel® 120MHz Pentium® Processor
- 16MB EDO Performance DRAM
- 850MB 10ms EIDE Hard Drive
- 1MB DRAM, 64-Bit PCI Graphics Accelerator
- 8X CD-ROM Drive/3.5" Diskette Drive
- 16-Bit Gateway Sound Card
- Altec® Lansing ACS-40 Speakers
- TelePath® 28.8 Fax/Modem
- CrystalScan® 15.28dp Monitor (13.9" viewable)
- 7-Bay Mini Tower Case
- 104* Keyboard & MS Mouse 2.0
- Microsoft® Windows® 95
- Generations II Software Collection

\$1999**P5-133 FAMILY PC**

- Intel 133MHz Pentium Processor
- 16MB EDO Performance DRAM
- 256K Pipelined Burst Cache
- 1.62GB 9ms EIDE Hard Drive
- 2MB DRAM, 64-Bit PCI Graphics Accelerator
- 8X CD-ROM Drive/3.5" Diskette Drive
- 16-Bit Gateway Sound Card
- Altec Lansing ACS-40 Speakers
- TelePath 28.8 Fax/Modem
- Vivitron™ 17.26dp Monitor (15.9" viewable)
- 12-Bay Tower Case
- 104* Keyboard & MS Mouse 2.0
- MS Windows 95
- Generations II Software Collection

\$2549**P5-166XL**

- Intel 166MHz Pentium Processor
- 16MB EDO Performance DRAM
- 512K Pipelined Burst Cache
- 2.5GB 11ms EIDE Hard Drive
- Matrox® 2MB WRAM Graphics Accelerator
- 8X CD-ROM Drive/3.5" Diskette Drive
- 16-Bit Ensoniq® Wavetable Sound Card
- Altec Lansing ACS-400 Speakers w/ ACS-250 Subwoofer
- TelePath 28.8 Fax/Modem
- Vivitron 17.26dp Monitor (15.9" viewable)
- 12-Bay Tower Case
- 104* Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition*
- Generations II Software Collection

\$3299

- Microsoft Encarta® 96
- MS Cinemania® 96
- MS Julia Child: Home Cooking with Master Chefs
- MS Bob™ for Gateway 2000
- MS Works 95
- MS Publisher 95
- MS Money 4.0
- MS Golf 2.0
- MS Music Central™ 96
- MS CD Sampler
- MS Entertainment Packs 1-4 (31 fun games!)
- Ca\$h Graf Home Office Plus™
- Mayo Clinic® Family Health Book
- Mediamatics Arcade™ MPEG Player
- The Masters®: Interactive Journey Through Its 60-Year History, for MS

Destination Big Screen PCs

(Currently available for sale only in the U.S.)

P5-120

- P5-120 Family PC config above, excluding speakers, w/ Destination Big Screen PC upgrade (details on next page) replacing corresponding components and software

\$3599**P5-133**

- P5-133 Family PC config above, excluding speakers, w/ Destination Big Screen PC upgrade (details on next page) replacing corresponding components and software

\$3799**P5-166**

- P5-166 XL System config above, excluding speakers, w/ Destination Big Screen PC upgrade (details on next page) replacing corresponding components and software

\$4399**Professional Systems****P5-100**

- Intel 100MHz Pentium Processor
- 16MB EDO Performance DRAM
- 850MB 10ms EIDE Hard Drive
- 1MB DRAM, 64-Bit PCI Graphics Accelerator
- 8X CD-ROM Drive/3.5" Diskette Drive
- CrystalScan 15.28dp Monitor (13.9" viewable)
- 7-Bay Mini Tower Case
- 104* Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition*

\$1749**P5-133**

- Intel 133MHz Pentium Processor
- 16MB EDO Performance DRAM
- 256K Pipelined Burst Cache
- 1.62GB 9ms EIDE Hard Drive
- 2MB DRAM, 64-Bit PCI Graphics Accelerator
- 8X CD-ROM Drive/3.5" Diskette Drive
- Vivitron 15.26dp Monitor (13.9" viewable)
- 7-Bay Mini Tower Case
- 104* Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition*

\$2099**P5-166**

- Intel 166MHz Pentium Processor
- 16MB EDO Performance DRAM
- 256K Pipelined Burst Cache
- 2.5GB 11ms EIDE Hard Drive
- 2MB DRAM, 64-Bit PCI Graphics Accelerator
- 8X CD-ROM Drive/3.5" Diskette Drive
- Vivitron 17.26dp Monitor (15.9" viewable)
- 12-Bay Tower Case
- 104* Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition*

\$2699**G6-200**

- Intel 200MHz Pentium Pro Processor
- 32MB DRAM
- 256K Internal Cache
- 2GB Fast SCSI 9ms Hard Drive
- Matrox 4MB WRAM Graphics Accelerator
- 4X SCSI CD-ROM Drive
- 3.5" Diskette Drive
- Vivitron 17.26dp Monitor (15.9" viewable)
- 12-Bay Tower Case
- 104* Keyboard & MS Mouse 2.0
- MS Windows NT® Workstation 3.5 or MS Windows 95
- MS Office 95, Professional Edition*

\$4599**Gateway 2000® Solo™ Portable PCs****S5-75XL**

- 10.4" SVGA Color Display
- Intel 75MHz Pentium Processor
- 8MB RAM (expandable to 40MB)
- 256K Pipelined Burst Cache
- 540MB Hard Drive
- Modular 4X CD-ROM Drive
- Modular 3.5" Floppy Drive
- Integrated 16-Bit Sound with Stereo Speakers
- 1MB Video RAM
- Lithium Ion Battery & AC Pack
- 86-key MS Windows 95 Keyboard
- MS Windows 95
- MS Works 95
- Carrying Case

\$2899**S5-120XL BEST BUY**

- 11.3" SVGA Color Display
- Intel 120MHz Pentium Processor
- 40MB RAM
- 256K Pipelined Burst Cache
- 1.2GB Hard Drive
- Modular 4X CD-ROM Drive
- Modular 3.5" Floppy Drive
- Integrated 16-Bit Sound with Stereo Speakers
- 28.8 PCMCIA Fax/Modem
- 1MB Video RAM
- Lithium Ion Battery & AC Pack
- 86-key MS Windows 95 Keyboard
- MS Windows 95
- MS Office 95, Professional Edition*
- Carrying Case

\$5599

All desktop systems standard with Gateway Gold™ Service & Support, which includes 3-year limited warranty. All portable PCs standard 1-year limited warranty. Call or write for a copy of our warranty.

The Gateway Solo line starts at 5.4 lbs. Weight includes 8MB RAM, 810MB hard drive, Lithium Ion battery & option bay cover.

* MS Office 95, Professional Edition includes Word, Excel, PowerPoint® presentation graphics program, Schedule+, Access database and Bookshelf® '95.



Toll free from Canada
800-846-3609



Toll free from Puerto Rico
800-846-3613



8 8 8 - 2 0 0 - 0 6 3 1

<http://www.gw2k.com>



pentium
PROCESSOR

Destination Big Screen PC Upgrade

In the market for a multimedia PC? Consider upgrading to a Big Screen PC. Just like all our computers, the Destination Big Screen PC is built to order, with your choice of Pentium® processor, RAM, hard drive, CD-ROM drive, diskette drive, and fax/modem.

The following Destination components replace the corresponding standard components of the Family PC and XL multimedia systems:

- **Graphics Accelerator:** Destination 2MB VRAM Graphics Accelerator w/ Cable-Ready TV Tuner
- **Sound Card:** 16-Bit Hi-Fi Wavetable Audio Card
- **Monitor:** Destination31 VGA Monitor (31" viewable)
- **Case:** 7-Bay Charcoal-Colored PC Case
- **Keyboard:** Wireless Keyboard with Integrated EZ Pad™ Pointing Device
- **Mouse:** Field Mouse™ Remote with Integrated Trackball and Four-Channel RF Receiver
- **Software:** Destination Software Collection

(Call about this package of software specially selected for the Destination Big Screen PC's extraordinary multimedia capabilities)

- **Speakers:** Not included. The Destination Big Screen PC has been designed for easy integration with your existing stereo system. Need a high-quality sound system?

See option at right.

Bigger-Than-Life Extras!

Multimedia/Communication

- **Altec™ Lansing ACS-250 Subwoofer \$75**
(upgrade from PCs that include Altec ACS-40 speakers)
- **Altec ACS-400 Speaker System w/ ACS-250 Subwoofer \$120**
(upgrade from PCs that include Altec ACS-40 speakers)
- **TelePath® 28.8 Fax/Modem \$149**

Networking

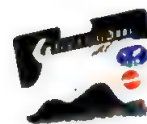
- 3Com® Ethernet Adapters
- **16-Bit Triple Media Card with BNC, AUI and RJ-45 connectors \$99**
- **16-Bit Card with only RJ-45 connector \$79**
- SMC® ISA Ethernet Adapters
- **16-Bit Triple Media Card with BNC, AUI and RJ-45 connectors \$79**
- **16-Bit Card with only RJ-45 connector \$59**

Printers

- **Epson® Stylus™ Color IIs Ink Jet Printer \$219 less \$30 rebate**
- **Hewlett-Packard DeskJet 600C Ink Jet Printer \$259**
- **Epson Stylus Color II Ink Jet Printer \$299 less \$30 rebate**
- **Hewlett-Packard LaserJet 5L Printer \$479**
- **Hewlett-Packard LaserJet 5P Printer \$849**

Software

- **Kid's Backpack™ III**
Includes Schoolhouse Rock!™; Grammar Rock™; Sesame Street: Get Set to Learn™; Math Blaster 2™; Secret of the Lost City; Imo & The King™; Putt-Putt® Goes To The Moon™; and Gateway cow-spotted backpack. **\$59**
- **Finance Pack (U.S. Shipment Only)**
Includes Quicken® Deluxe 5, Quicken Financial Planner™, Quicken Family Lawyer™, and Quicken Parents' Guide To Money™. **\$69**
- **Gateway Gamer's Pack**
Includes Command & Conquer™, Virtual Pool™; Straight/8, The Journeyman Project 2™; Buried in Time™, Terminal Velocity™, Primal Rage™, and a Gravis™ GamePad™. **\$79**



Gateway accepts most major credit cards and C.O.D. terms, with net 30-day terms and leasing options available to qualified commercial customers. You can also apply for the Gateway 2000 DuoLine™ MasterCard® card, issued by Dial National Bank, Des Moines, Iowa.



Option

■ **harman/kardon High-Fidelity Sound System**

Seven-piece Dolby Pro Logic® Surround Sound speaker system including AVR-10 audio/video receiver with remote, subwoofer, center channel, and four satellites for the ultimate home stereo experience. **\$699**

■ **Flight Pack II**

Includes Comanche™ 2.0, EF 2000™, Su-27 FLANKER™, Flight Unlimited™, U.S. Navy Fighters™ and joystick. **\$99**



■ **Sports Pack II**

Tony La Russa Baseball 3™, Indy Car® Racing II, PGA Tour® 96, Quarterback Attack™, Alexi Lalas Red Hot Soccer, and a Gravis GamePad. **\$79**

Service & Support

Gateway Gold™ Premium

- **Extended Three-Year On-Site Agreement***

- **Priority 800 Number For Access To Technical Experts**

With system purchase **\$99** / Within current on-site service agreement **\$129**

*On-site service for desktop and tower systems is available to most U.S. and Canadian locations after determination by a Gateway tech that you need it. On-site service is provided by PC Technology Services Inc. Write or call for a free copy of our on-site service agreement.

Call the Gateway 2000 component add-ons division at 800-846-2080 for our complete line of extras for Gateway customers.

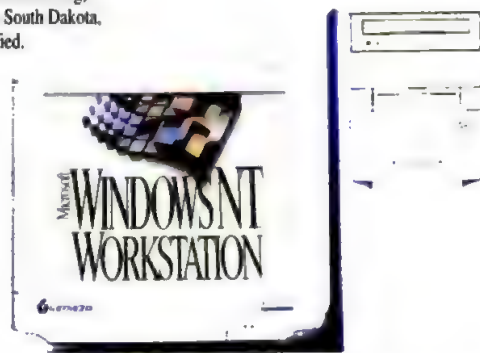
Sales Hours: 7am-10pm Weekdays (CDT).

GSA Schedule # GS-00K-94-AGS-5150-PS01



Gateway 2000 Manufacturing, North Sioux City, South Dakota, is ISO 9002 certified.

P5-166
Professional System shown with optional Microsoft® Windows NT® operating system, available pre-installed on any Gateway desktop PC for only \$99.



8 8 8 - 2 0 0 - 0 6 3 1

<http://www.gw2k.com>



Ask About Our "90 Days No Payments" Program!

content is thin. Selecting a Web resource during an MSN session automatically launches your default browser (Microsoft Internet Explorer 2.0 is available free from MSN) and retrieves the indicated URL. You can directly access the Web by clicking on the Internet Explorer button. MSN also delivers a selection of Usenet news groups viewable only with the MSN software. MSN does not currently let you post a personal Web page on its server.

BETTING CONNECTED

Microsoft includes the MSN client in Windows 95. The easy setup process finds your modem's current properties and automatically looks up your primary and backup local access numbers. You can connect to MSN through a network-based Internet connection (firewall incompati-

bilities may require the use of a proxy server) and most MSN POPs also support single-channel ISDN connections. MSN doesn't support family accounts with different access privileges for adults and children. You can disable access to adult-oriented MSN sites for the entire account but you can't filter Internet access.

MSN delivers many attractive services through an excellent interface. Its content lacks the depth of AOL's and its computer coverage can't compare to CompuServe's, but what's available is well-presented and its Web integration is strong.—*Thomas Mace*

The Microsoft Network. Basic price: \$4.95 monthly for 3 hours, \$2.50 for each additional hour. Microsoft Corp., Redmond, WA; 800-386-5550, 206-882-8080; fax, 206-936-7329. <http://www.msn.com/>. Circle 465 on reader service card.

MSN's Outpost on the Web

MSN's Web site (<http://www.msn.com>) is a frontier outpost for MSN's coming migration to the Web. It has almost no content of its own today but it delivers a slick, well-designed package of links to other Web sites and services.

Its most impressive feature is a personalized start page which greets you by name and presents you with a roster of your favorite sites. Using a simple setup screen, you can set it to display six favorite links and a search form for your favorite search engines (choices include Excite, Infoseek, Lycos, Magellan, Microsoft, and Yahoo). You can include up to seven stocks to track through DBC Online, a variety of sports scores via ESPN's SportsZone, four general news topics from Reuters/Excite, computer news from Ziff Davis, TV listings from TV1, a selection of four comics (including Dilbert), and a variety of other services including weather reports. One of the most impressive, MovieLink, shows movie listings in your area.

Other msn.com pages worth visiting include the Internet Services Directory, which provides handy links to a variety of Web services from



Create your own start page from msn.com.

Federal Express package tracking to AT&T's 800-number directory. Link Central gives you good selection of interesting Web links and pointers.

Microsoft's Web site also serves as a gateway to information about Microsoft products. Most links lead to Microsoft's corporate Web site, where you'll find a host of information and services including the Microsoft Knowledge Base and a huge library of free downloads.

Microsoft's msn.com is not a large or complex site but it does a superb job of making Web resources accessible. If its slick design and logical layout are any indication, MSN on the Web will be worth visiting.—*TM*

Prodigy Services Co.

Prodigy

Prodigy was once a leading online service, and it was the first service to offer full Internet access. Today, it lags behind its competitors in both technology and in the depth of its content. If you want a hand-held introduction to the Internet or your primary interest is exchanging messages with other users or participating in live chat, Prodigy may be for you. But if you're looking for the sort of online service where you can download a driver for your video card or do some serious research, you're better off elsewhere.

MEET THE INTERFACE

When you first log on to Prodigy, you may be confused by its plethora of lists, menus, and buttons, many of which duplicate each other's functionality. The opening screen contains scrollable lists of the content areas, but there's also a Contents menu on the top menu bar. The Go To menu offers Jump To and Navigate choices, which confusingly perform the same function: bringing up the Go To dialog box. The Highlights button on the bottom of the screen always brings you back to the opening screen, but you can get there other ways as well.

CONTENT OR DISCONTENT?

While Prodigy gives you more than enough navigation tools, the content you'll navigate is decidedly thin in some areas. Prodigy's only general reference offering is Compton's Online Encyclopedia. Prodigy has fewer than ten magazines online while AOL has over 50. It offers seven regional newspapers, but some of them are premium services. It does supply news from the Associated Press's various wire services. Prodigy's 25 online stores add up to a modest online shopping offering. And if you compare Land's End on Prodigy with Land's End on the Web, for example, you'll find the Web site superior because you can actually see the merchandise.

There are exceptions to the general trend, however. Kids Zone is one of the stronger Prodigy content areas, featuring interactive games, children's magazines and TV shows in addition to the highly re-

YOUR BROADCAST STATION TO THE INTERNET

LUCKMAN'S

WEB COMMANDER

FULLY SECURE WEB SERVER - EASY TO SET UP - EASY TO USE

Full Security
S-HTTP and SSL

HTML authoring tool
including dozens of home
pages, templates & forms

Browsers
Microsoft Internet Explorer
Spyglass' Enhanced Mosaic

Image Map Editor

Real Time Monitoring
Reporting & Logging

CGI Connectivity

Excite & MSN Search engines

POP3/IMAP Mail server

Multi Platform server

Web Tree graphically displays
all documents & links

Full support
for CGI script

Automated mail send
clearing & verification

The Java Developer's Kit



NOW

YOU CAN HAVE:

MORE EXPOSURE

MORE VISIBILITY

MORE BUSINESS

BY PUBLISHING

ON THE WEB

Web Commander has it all.
Completely wizard driven, Web Commander is the fastest,
easiest to configure server software on the market with
all the tools for fully secure business on the Internet.

WINDOWS 95 \$129.00 MSRP
WINDOWS NT \$249.00 MSRP

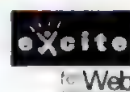
Call Today:
1-800-711-2676
E-Mail: info@luckman.com
<http://www.luckman.com>
1055 West 7th Street, Los Angeles, CA 90017
CIRCLE 006 ON READER SERVICE CARD



Luckman Interactive, Inc.™



SLmail95



garded Homework Helper.

The highlight of its business content is the PC Financial Network, offering discount online investment trading. PCFN makes it easy for neophytes to get started in the stock market, offering lots of explanation and definitions and providing price quotes for most major investment types.

A single master utility gives you access to all file libraries, which range from Antiques to UFOs (we found only two computer vendor file libraries, however). All libraries are for downloading only; members can't yet contribute files.

COMMUNITY SPIRIT

E-mail and chat are the only features where Prodigy can hold its own against the competition. It's easy to add people to

SUITABILITY TO TASK		
Prodigy		
	Power	Ease
Connectivity and navigating	Fair	Good
Community	Fair	Good
Content	Fair	Good
Downloading software	Fair	Good
Internet access	Fair	Good

your e-mail address book, create mailing lists, and specify which addresses are on the Internet and which are within Prodigy. If you want to compose and read e-mail offline, you need to download an additional software module at a cost of \$14.95 (this module may be free by the time you read this).

Mail exchanged between Prodigy accounts can include binary attachments

and be marked as urgent. You can highlight from within the mail reader and spell-check your messages.

Prodigy has a chat room for every interest imaginable and it sponsors frequent chats with minor celebrities. We found that the majority of these rooms were empty at any given time, however. You can create a chat room of your own and restrict access to it with a password. Member-created groups are limited to 15 participants by default, but some standard rooms accommodate up to 50, far too many for civilized conversation. You can check personal data for fellow chat participants if they have entered their Member Info. And if you don't want your online conversations to remain ephemeral, there's a logging option that

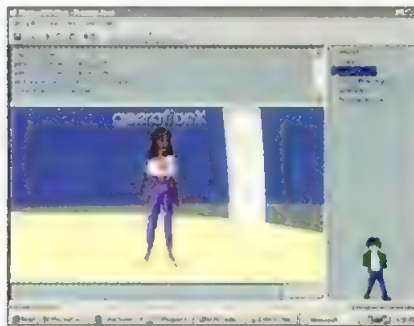
Avatars and Virtual Worlds: The State of the Chat

Chatting with strangers online has been popular since the mainframe days. Avatar chats, which take place in three-dimensional virtual worlds, take this intriguing pastime to a whole new dimension. An avatar is an image that represents you in the virtual world where the chat takes place. As you explore the virtual landscape, you see other avatars and talk to them by typing in your comments. The virtual world itself is a great ice-breaker; you always have something to talk about.

There are two avatar chats available on the online services: MSN's V-Chat and CompuServe's WorldsAway. Other avatar chat packages have cropped up on the Internet, including WorldsChat and AlphaWorld, both from Worlds Inc. (AlphaWorld is in beta and did not run reliably enough to test). Each chat world has its own character and strengths, but WorldsAway may hold your interest the longest.

V-CHAT

V-Chat is basically an extension of the old text-based chat metaphor through avatars. It provides a 3-D environment that you can explore, and you can hear background sounds, but you can't interact with your environment in any



MSN's avatars cut straight to the chase.

way. V-Chat's avatars can flirt, smile, wave, make silly gestures, and more. But they don't walk and move normally; they float.

Also, V-Chat forces you to use your MSN ID—which is often your first and last name—as your handle, which can spoil the fantasy. V-Chat's best feature is the ability to create custom avatars and upload them to the server so others can see them. If you've enabled access to MSN's Adult Chat, you can even upload a risqué avatar for yourself.

WORLDSAWAY

CompuServe's WorldsAway, with its token economy, offers the richest virtual world. You obtain tokens by hanging around online, and it's fun to spend your money in the virtual world. Each

avatar has a head and a body, and it walks normally from place to place. You create avatars by purchasing pre-built components from vending machines. You can't create new images, but there are so many options to choose from that this is not really a disadvantage. The potential for exploring and the entertainment from the other participants helps WorldsAway retain its charm longer than other chats.

In WorldsChat, on the other hand, you pick your avatar by roaming through a gallery; there aren't that many options. WorldsChat avatars can't move their legs to walk or gesture; the effect is like moving cardboard cutouts. You can create an avatar but can't upload it to the server.

WorldsChat gives you many areas to explore and some entertaining surprises. For example, you can walk through the looking glass in one of the rooms in House of Glee. When you do, you'll find yourself in a maze where the walls are lined with foliage and pink flamingos. If you choose the correct path through the maze, you'll come to a secret door. On the other side is a strange room with odd writing on the walls. But once you find all the surprises, there's not much to keep your interest but plain-old chat.—Sheryl Canter

OUR EDITORS REVIEWED 100,000 WEB SITES SO YOU WON'T HAVE TO!

LUCKMAN'S

OFFICIAL

INTERACTIVE

World Wide Web

YELLOW PAGES

10,000 of the Best
Sites on the Web

Site Ratings Include
Download Time

Detailed Site
Descriptions

Offline and Online
Searching

PC & Mac CD-ROM
\$59.00^{USD}

Fast & easy access to the best of the Web!



LUCKMAN'S

OFFICIAL

World Wide Web
YELLOW PAGES

LUCKMAN'S
World Wide Web
YELLOW PAGES

Luckman's Official Interactive World Wide Web Yellow Pages™ is the easiest, most useful Web site directory available for the Internet. Of the more than 100,000 sites on the Web, our editors have found, reviewed, rated, and compiled over 10,000 of the very BEST.

A built-in search engine locates sites by category, name, description, keyword or site rating. A mouse click on the site name or URL automatically connects you to the Internet, launches your browser and takes you to the Web site.
Call today: 1-800-711-2676

E-Mail: info@luckman.com <http://www.luckman.com> 1055 West 7th Street, Los Angeles, CA 90017

Luckman Interactive, Inc.™

*"and while you're at it
can you make that Internet thing work for us?"*

Solaris[®] Internet Server Software



For secure access, publishing & commerce. Works with what you have.



Keeps you up and running. Grows with you. Contact: 1-800-SUNSOFT or <http://www.sunsoft.com>

 **SunSoft**
THE FUTURE OF THE COMPUTER

CIRCLE 315 ON READER SERVICE CARD

records the chat as a text file. While you won't find 3-D avatar-based chatting, Prodigy offers Pseudo Chat, where chat-ters send images and sounds in an uncensored adult area.

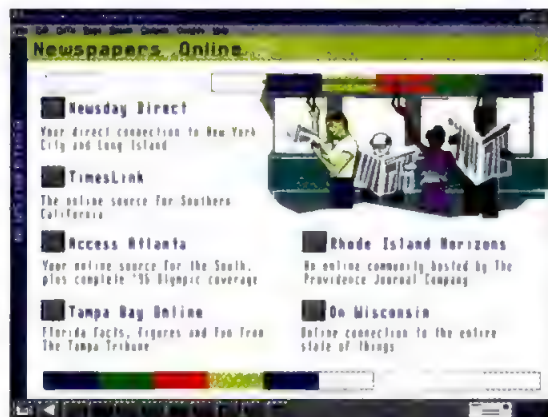
Bulletin Boards (BBs) let you post permanent messages for other Prodigy users to read and reply to. BBs are threaded discussion areas devoted to interest topics ranging from Adoption to Video Games. Almost every feature of Prodigy has a corresponding BB and most BBs have an associated chat room. Many computer companies have BBs, offering you a venue for technical support. The BBs are closely supervised and proper conduct is enforced. To manage your BB activity off-line, you need to download an extra-cost program (\$19.95).

INTERNET ACCESS

Prodigy was the first online service to offer full Internet access, but it's fallen

behind in this arena too. While you don't need much extra setup or downloads to start browsing the Web, you're limited to using Prodigy's outdated browser. There's also no telnet or IRC chat capability. While you can access all newsgroups, the primitive newsreader cannot handle inline uuencoding. FTP and Gopher are handled only through the Web browser. The situation may soon improve. Prodigy recently licensed Netscape Navigator and plans to support third-party browsers.

Members can post personal home pages on Prodigy's server with the first 1MB of data free. Building pages demands some knowledge of HTML, though, since Prodigy offers a visual HTML editor rather than the page-cre-



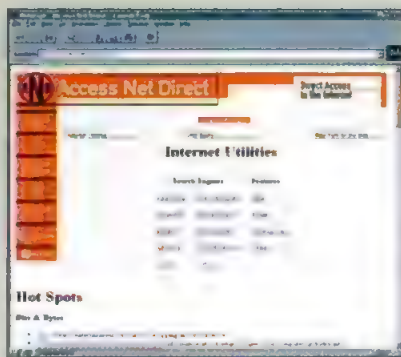
Prodigy lacks the slick graphics and the multitude of varied content its competitors boast.

Prodigy's Multiple Web Presences

Prodigy currently has three presences on the Web. The Prodigy site (<http://www.prodigy.com>) is little more than an extended advertisement for the proprietary online service. The *antares.com* domain contains a lot of Prodigy's actual content but is only accessible to Prodigy members. Of greatest interest is Access Net Direct, a new Internet service provider that will offer Internet access across the country.

Access Net Direct was announced just as we were completing this evaluation. Accessible at <http://www.and.net>, the new service is most interesting in its pricing scheme: a flat rate of \$1 per hour with the first hour free every month. Within any month, you get 5 extra free hours for each \$15 dollars you spend. Prodigy is also offering a special service to businesses called &Partners, which will allow a company to brand its own Internet service.

Customers will use Netscape Navigator 2.0 as their interface for e-mail and newsgroups as well as for the Web. Separate FTP and telnet utili-



Access Net Direct: Pay as you go.

ties will also be provided. The *and.net* Web site will primarily be a place for sales and support. Its only content will be some navigation pointers and some links to Internet utility sites.

Now being tested in the New York region, Access Net Direct should be available to the rest of the country sometime this summer. Access Net Direct users will use different access numbers, but they'll still be dialing in to Prodigy's existing equipment. A Prodigy spokesperson stated that local-access numbers will be available in about 85 percent of the country.—MM

ation wizards found in other services.

Prodigy has put a lot of its content onto Web sites accessible only to Prodigy members. Usually found in the *antares.com* or *prodigy.com* domains, these Prodigy-created sites are much richer graphically than some areas on Prodigy itself. Highlights include Kiplinger's Personal Finance and Chat Soup, a gossip page. While this content is appealing, users may find it disconcerting when the separate Web browser launches without warning.

SETUP AND SUMMARY

Setting up Prodigy is a breeze, although it takes longer than the advertised 4.2 minutes. Setup detects your modem type and COM port automatically. A Prodigy account lets the primary member add up to five additional IDs. In many parts of the country, Prodigy's maximum connection speed is 14.4 Kbps, rendering your 28.8-Kbps modem connection useless for accessing the service and the Internet.

Prodigy can be useful to some, especially nontechnical people and people with children, for whom its simple setup, community features and easy Internet access make it appealing. But if you're looking for the state of the art, you will most likely be disappointed.—Michael Muchmore

Prodigy. Basic price: \$9.95 per month, \$2.95 per hour over the first 5 hours. Prodigy Services Co., White Plains, NY; 800-776-3449, 914-448-8000; <http://www.prodigy.com>. Circle 464 on reader service card.

NOTHING NOT INCLUDED



**OUR GoSITE™ SERVER GETS YOU ON THE NET AND IN FRONT OF MILLIONS IN ONE DAY!
IT'S TOTALLY PROFESSIONAL AND WE DO IT AT A PRICE THAT'S NOT TOO SHABBY.**

YOU GET:

- Your own domain name (www.pickaname.com, which you can see is very cool)
- A Web server
- A POP e-mail server (50 e-mail accounts, so now everyone in the office can be wired)
- Auto-Administration
- Full SSL Security/Encryption
- WebEdit© HTML Software
- FREE Overnight Delivery
- Complete, 24 hour customer service and technical support (not that you'd need this, but just in case...)
- Sample web pages & scripts

- CGI and Java compatible
- An FTP server
- 25 MB of storage space
- Unlimited Auto Responders
- Multiple T1 lines (the big-daddy phone lines designed for heavy usage)
- And a whole lot more!

Plus, you get our simple, point and click GoGadget™ Internet Site Administrator. It's a program designed to run on your local computer that automates all file management and creates a COPY of your site. Make a change to your site on your computer, press a button, and it's done.

On the net just that fast. But enough gibberish, call us to order the GoSite Server like nearly 1000 customers in 25 countries have. Because there's nothing not included.

1-800-800-1743

**INTERNET
DIRECT™**

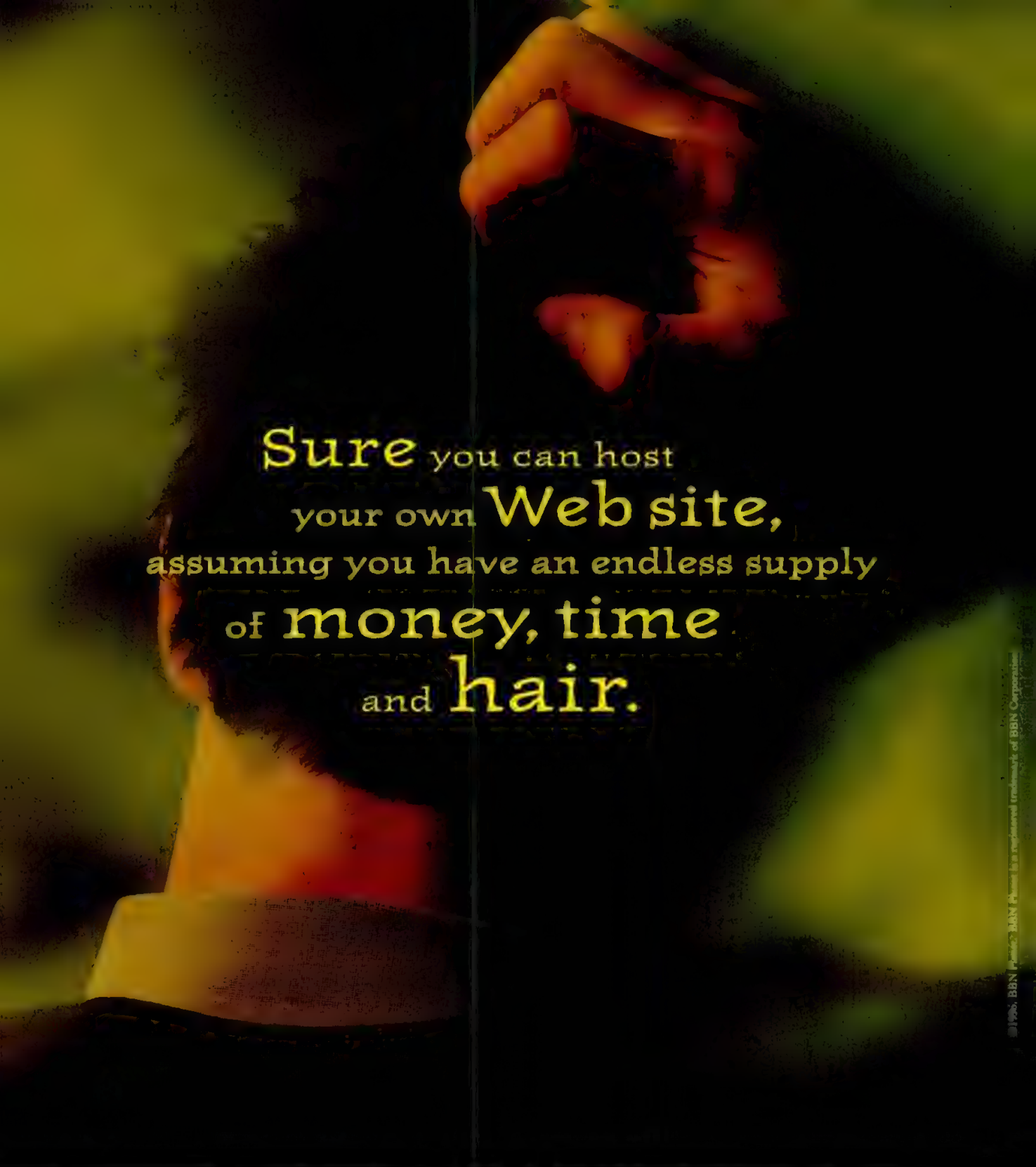
www.gosite.com sales@gosite.com

\$189/Month
30 day money back guarantee

BE SURE TO CHECK OUT OUR VALUE ADDED DEALER PROGRAM.

©1996-Internet Direct, Inc. GoSite, GoSite Internet Server, GoGadget, the GoSite Logo and Internet Direct are trademarks of Internet Direct, Inc.

CIRCLE 050 ON READER SERVICE CARD



Sure you can host
your own Web site,
assuming you have an endless supply
of money, time
and hair.

Why go through the aggravation of hosting your company's Web site internally when you can turn the job over to BBN Planet, a company with unparalleled Internet experience? Just think. No late-night maintenance emergencies, no phone calls from customers annoyed by access problems, no staffing headaches. With Web Advantage, you get high-end UNIX™ servers running Netscape™ software, high-speed T3 Internet connections and round-the-clock service and support – all without losing control over your site's content. For a free Cost Justification Analysis, visit <http://www.bbn.com/webadvantage> or call (800) 472-4565.



How Business Does Business
On The Internet.

CIRCLE 070 ON READER SERVICE CARD

SUMMARY OF FEATURES

Online Services



■ YES ■ NO

Products listed in alphabetical order

	America Online	CompuServe	The Microsoft Network	Prodigy	WOW! from CompuServe
Basic pricing	\$9.95 per month for 5 hours; \$2.95 each additional hour	\$9.95 per month for 5 hours; \$2.95 each additional hour	\$4.95 per month for 3 hours; \$2.50 each additional hour	\$9.95 per month for 5 hours; \$2.95 each additional hour	\$17.95 per month
Connectivity					
Local/toll-free telephone access	■ ■	■ ■	■ ■	■ ■	■ ■
Maximum widely available connection speed ¹	28.8 Kbps	28.8 Kbps	ISDN	14.4 Kbps	28.8 Kbps
Multiple profiles per account (family accounts)	■	■	■	■	■
Connection via Internet	■	■	■	■	■
Interface					
Requires proprietary client software	■	■	■	■	■
32-bit client	■	■	■	■	■
Character-mode access	■	■	■	■	■
Renders progressive graphics	■	■	■	■	■
User can disable graphics	■	■	■	■	■
E-mail					
Service provides proprietary e-mail	■	■	■	■	■
Binary attachments supported	■	■	■	■	■
User can set mail-delivery priority	■	■	■	■	■
Encryption available	■	■	■	■	■
User can create mailing lists	■	■	■	■	■
User can read and write mail off-line	■	■	■	Optional ²	■
Organize mail by categories	■	■	■	■	■
Live Chat					
Member chat facilities provided	■	■	■	■	■
Lock out undesirable users	■	■	■	■	■
Hide real name (use handle)	■	■	■	■	■
Public/private chat rooms	■ ■	■ ■	■ ■	■ ■	■ ■
Avatar-based chat available	■	■	■	■	■
View active participants/who enters or leaves	■ ■	■ ■	■ ■	■ ■	■ ■
Private messaging available during public chat	■	■	■	■	■
Special-interest group areas					
Service provides areas for special-interest groups	■	■	■	■	■
Associated libraries provide text/binary files	■ ■	■ ■	■ ■	■ ■	■ ■
Message searching available	■	■	■	■	■
Membership searching available	■	■	■	■	■
Topic finder	■	■	■	■	■
Online purchasing	■	■	■	■	■
Vendor support online	■	■	■	■	■
Downloading					
Downloading supported	■	■	■	■	■
Background downloading	■	■	■	■	N/A
Restart/credit for failed download	■ ■	■ ■	■ ■	■ ■	N/A
Online shareware registration	■	■	■	■	N/A
Automatic unzip/virus check (client side)	■ ■	■ ■	■ ■	■ ■	N/A
Forum-wide/service-wide search for files	■ ■	■ ■	■ ■	■ ■	N/A
Free uploading (no connect time)	■	■	■	■	N/A
Internet Access					
Web browser provided/Works with third-party browsers	■ ■	■ ■	■ ■	■ ■	■ ■
Proprietary Winsock required/Windows 95 Winsock-compatible	■ ■	■ ■	■ ■	■ ■	■ ■
Newsreader provided	■	■	■	■	■
Unlimited newsgroup access	■	■	■	■	■
FTP provided	■	■	■	■	■
Space provided for each member home page	2MB	1MB	None	1MB	None
Directory of user home pages	■	■	N/A	■	N/A
HTML authoring software provided	■	■	N/A	■	N/A

¹ The speed is available to at least two-thirds of U.S. nodes. ² This feature is scheduled to be included at no extra cost by the time you read this.
N/A—Not applicable: The product does not have this feature.

CompuServe Inc.

WOW! from CompuServe

WOW! from CompuServe is a fledgling online service targeted at the technology-shy consumer who wants to go online with a family computer but dreads the thought of Winsocks and IP addresses. With its vivid, graphical interface, WOW! strives to simplify the process of going online and onto the Internet, and it largely succeeds. For more advanced users, it may end up oversimplifying the online experience. Its \$17.95 monthly price covers unlimited usage, which will appeal to those planning long hours of online encounters.

In testing, which took place during WOW!'s first week of public availability, we ran into numerous potholes and glitches. This is not uncommon for a new service, but CompuServe needs to address these technical issues before WOW! is ready for prime time.

INSTALLATION

Installing WOW! is easy; a sign-up wizard accompanied by audio help will walk you through the entire process of setting up an account. The software will even select an access number based on the phone number you're calling from. The service runs on top of the CompuServe network infrastructure and uses the same access numbers as CompuServe information services. Toll-free technical support is also available.

Be aware that when you click on the one-button Install WOW! option, the program will dump 29MB of data on your hard disk. The software is currently for Windows 95 only; a Macintosh version is planned for release later this year.

When you first click on the WOW! icon on your desktop, you'll be prompted to select your account name and enter your password. WOW! supports five additional sub-accounts on a single master account, and you can create both adult and children's views for different members of the family; a view targeted at teens is planned.

The kids' view has a cute cartoonish interface and content aimed at children six to 12. This view lacks chat and shopping features, and lets parents opt to screen their children's incoming e-mail. Also, the kid's Web browser will only access sites screened and approved by WOW!'s staff (WOW! establishes a standard PPP con-

nection, so a Net-savvy kid can still launch any 16-bit Web browser and surf the Web or Usenet without restrictions).

The adult interface has been designed from the ground up with elegant simplicity, and a degree of uniformity that makes it easy for newcomers to learn the ropes. From WOW!'s opening screen, you can connect to the service to access your mail, view What's New, or even go directly to one of your bookmarked locations. You can also opt to go to the Main Menu and quickly navigate off-line to the various topics and sub-topic communities WOW! offers.

The Main Menu contains five subjects: Entertainment, Living, Money, Sports, and Member Services, and each subject

simplified interface leaves out the Forward button and, most importantly, the URL locator bar. You can view the current URL, but only by accessing Properties through the right-click context menu.

The mail engine only queries your mailbox for mail at the start of your session and whenever you choose to send mail. Binary attachments cannot be sent over the Internet with uuencoding.

The first week WOW! was live was a little rocky, with numerous connection problems and server troubles. Speed was also a problem; loading some pages on WOW! meant an interminable wait at 14.4-Kbps. Another weakness is that the search function automatically invokes a customized view of the Lycos A2Z Web directory, which can be both cumbersome and inaccurate when looking for WOW!-specific information.

There are other omissions that weaken the service. You can't set up mailing lists or forward mail messages. The WOW! browser lacks support for helper applications, making it impossible to use such popular utilities as QuickTime and RealAudio. WOW! also removes the Windows 95 taskbar; it only comes back into view if you press Ctrl-Esc.

Thanks to an appealing and

undaunting user interface and easy, seamless integration with the Internet, WOW! succeeds in its goal of simplifying the experience of being online. If CompuServe can fix the snafus and ramp up WOW!'s content, it will be an attractive option for online novices.—*Melissa J. Perenson*. □

WOW! from CompuServe. Basic price: \$17.95 per month. CompuServe Inc., Columbus, OH. 800-943-8969, 614-717-4600. <http://www.wow.com>. Circle 466 on reader service card.



WOW! from CompuServe lets you perform six standard actions in each of its content areas.

contains ten related sub-topics. Each sub-topic has six actions you can perform within that subject: messaging, chat, shopping, Internet, reference, and news. Alternately, you can go directly to these actions, and then select the topic you'd like to perform that action on.

We were hard-pressed to judge the strength of the content of these areas during testing, as not all of the announced third-party content was online yet. They all provided interesting selections of Internet and shopping links. Some of the reference topic areas had weak selections, and we were unable to find libraries of downloadable files.

SIMPLIFIED BROWSER

WOW! uses a custom version of Microsoft's Internet Explorer for viewing both its proprietary HTML content and external Web and News sites. The highly

SUITABILITY TO TASK

WOW! from CompuServe

	Power	Ease
Connectivity and navigating	Fair	Excellent
Community	Fair	Fair
Content	Fair	Excellent
Downloading software	N/A	N/A
Internet access	Poor	Good

N/A—Not applicable: WOW! does not have this feature.

Upgrade for
just \$69*

From HoTMetal PRO 2.0,
OR ANY OTHER WEB PUBLISHING TOOL
Call 1-800-387-2777 to order
(for upgrades only)

*plus applicable taxes

Why Struggle?

Getting
Started is
Fast & Easy

Just open up a
HoTMetal template
and start typing

Import your word
processing files and
convert them to Web
pages automatically

Creating Pages for the Web

Creating
Great Looking
Pages is a Snap

Simply point and click
to add frames, Java,
OLE, or any of the
latest browser
extensions to your
Web documents

Drag and drop to
add multimedia
and polish
your graphics
right inside
HoTMetal.

Why struggle when you can use the
easiest, most powerful Web publishing
software, SoftQuad HoTMetal PRO 3.0

Stop battling with complex codes and cryptic HTML commands.
Just open a file and start creating. With its intuitive drag-and-drop
interface, WYSIWYG display, automatic file conversion to HTML
and ready-to-use templates & sample files, SoftQuad

HoTMetal PRO 3.0 makes Web publishing

a snap. And because

HoTMetal PRO 3.0

is packed with the

most complete set

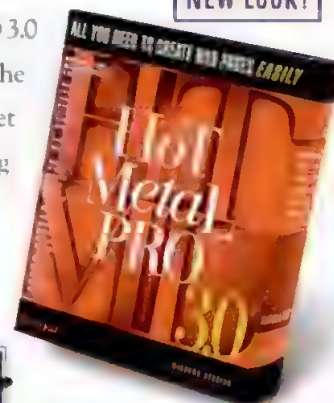
of power publishing

tools available, there's

no limit to the kinds of

exciting pages you can build.

NEW LOOK!



Simply the best way to
create Web pages



From the makers of the
award-winning HoTMetal PRO 2.0

SoftQuad
<http://www.softquad.com>

Available now at these and other software outlets:



Fry's Electronics and Micro Center.

For more information: In North America, call toll free: 1-800-360-8454. In the U.K. and Europe, call: +44 (0)181 236 1001
Want to know more? Go to <http://www.softquad.com> for details, system requirements and specials.

CIRCLE 346 ON READER SERVICE CARD

Find out what makes the Pentium® Pro processor tick.



Visit Intel's exciting new Web site to learn about the technology that makes the Pentium® Pro processor so fast.

▶ www.intel.com/technology/tech-briefs/pentiumpro

intel®



FAST CONNECTIONS

ISDN, ADSL, cable modems, and satellites promise lightning-fast access to online services and the Internet. But which can you use today? Or should you wait?

The content provided by online services and the World Wide Web has evolved from simple text to a mixture of text and graphics to full-motion video and sound. Multimedia content requires lots of bandwidth, and many users are finding that their 28.8-Kbps modems just don't cut it anymore.

Apart from Web surfing, many companies rely on remote LAN nodes, videoconferencing, and groupware systems to coordinate an increasingly mobile and scattered work force. These applications need bandwidth too.

We've become accustomed to

seeing modem speeds double or quadruple about every two years. The latest crop of modems promises speeds up to 33.6 Kbps, but for the first time since the dawn of the PC, there's no speed-doubling modem technology on the horizon.

All modems operate at the mercy of the telephone network. Even on a good, clean line, you're lucky to get a full-speed 28.8-Kbps connection. Because V.34 modems adapt themselves to telephone-line conditions, many 28.8-Kbps connections end up running at 24 Kbps or slower—that is, once you're connected. As anyone

By Les Freed

who has used a V.34 modem knows, the dialing and modem handshaking time can be 30 seconds or more.

So where do we go from here? We go digital. In recent months, we've seen a surge of interest in new data communications technologies for the home and small businesses. ISDN technology is grabbing headlines, and it appears that the long-awaited and oft-proclaimed Year of ISDN is finally here. For this roundup, we tested six ISDN terminal adapters.

Just as ISDN is gathering momentum, though, some observers—and promoters of competing technologies—are saying that ISDN offers too little, too late. Direct broadcast satellite, cable modem, and Asymmetric Digital Subscriber Line (ADSL) technologies can provide faster, cheaper connections than ISDN. They won't be widely available, however, for several years. Until then, ISDN is your

best choice for high-speed connections to online services and the Internet.

WEB CRUISING FROM OUTER SPACE

Hughes Network Systems offers a high-speed data service using the same DSS (Digital Satellite System) satellites that bring HBO and Showtime to your TV. The \$699 DirecPC system (800-347-3272) uses a special receiver on an ISA card connected to a slightly larger-than-normal 24-inch satellite dish to provide a 400-Kbps link to the Internet. In this new role, Hughes is bypassing both the local phone companies and Internet service providers.

reading is primarily a one-way operation—you click the mouse once and receive a screenful of data—the slow outbound speed may not be a problem.

The price is right too: Hughes charges \$16 or \$40 per month, depending on the volume of your usage. But you'll need a place to put the dish and a way to get the cable from the dish to the DSS receiver. You'll also need a clear view from the dish to the DSS satellites, which hover over the equator south of Texas.

If you can live with the low-speed outbound connection and the dish-positioning requirements, DirecPC may be the ultimate Web-cruising connection.

Because the DSS system is one-way, that speed is for received data only. Your outbound data must travel via a V.34 modem on a dial-up line, limiting your outbound speed to 28.8 Kbps. But as most Web browsing and newsgroup

IN THIS REVIEW

Adtran ISU Express.....	163	Editors' Choice	145
ISDN*tek CyberSpace		Should You Turbocharge Your	
Internet+Plus Card	166	Telecommuters?.....	150
Mitsubishi NetViper	170	Another Route to ISDN	157
Motorola BitSurfr Pro	170	Performance Tests	160
3Com Impact	177	Summary of Features.....	169
U.S. Robotics Sportster ISDN 128K	181	Getting Connected.....	174

Fast Connections Compared

	ISDN	Direct-broadcast satellite	ADSL	Cable modem
Signaling speeds	56 Kbps to 128 Kbps, depending on the number of channels	400 Kbps downloading, 28.8 Kbps uploading	1.6 to 6 Mbps downloading, 64 Kbps uploading	10 Mbps downloading, 28.8 to 768 Kbps uploading
Cost estimates	\$350 to \$500 up front; \$24 per minute and \$60 per month for ISDN (plus ISP charges)	\$700 up front; \$16 to \$40 per month for Internet service	Probably \$300 to \$500 up front, plus monthly subscriber and ISP charges	Probably \$300 to \$500 up front, plus monthly subscriber and ISP charges
Service providers	Local telephone companies, long-distance carriers	One vendor	Local telephone companies, long-distance carriers	Local cable companies, long-distance carriers
Availability	Generally good and getting better	Fast ramp-up is expected once it starts	Will be slowly adopted community by community	Will be slowly adopted community by community
Barriers to commercial success	Lack of telephone company initiative; tariff problems	Lack of competitive pricing	Must be within 2.3 miles of central office; requires investment in new technology; telephone company must become partner with an ISP	Requires investment in two-way cable technology; cable company will probably partner with an ISP
Subscriber equipment needed	ISDN adapter	Satellite terminal and receiver	ADSL modem	Cable modem and 10Base-T connection
Suitability for Internet access	Excellent service from many ISPs	Excellent, but probably no choice of ISP	Excellent, but probably little or no choice of ISP	Excellent, but probably little or no choice of ISP
Suitability for remote-LAN access	Excellent; getting more practical	Poor	Poor, except between nearby premises with dedicated copper cables	Excellent within the same community; otherwise poor

57 WEB SITES AND NOTHIN' ON?

Two-way digital cable service is an evolutionary change that will emerge community by community over the next decade and make the deployment of ISDN look like an overnight event. The potential is great: Cable modems can provide high-speed Internet connections to cable subscribers—10 megabits per second (10 Mbps) or more depending on the modem. And cable companies have plans to take full advantage of this increased bandwidth by offering their own content rich with graphics, sound, and video. For example, Time Warner's Line Runner service, which has been tested in 400 homes in Elmira, New York, and will debut in Ohio this summer, plans to offer content from the media giant's own books, magazines, movies, and audio CDs. Other cable giants (also known as Multiple System Operators, or MSOs) are currently looking for partners to help them provide online multimedia games, education, and entertainment. And many of the test runs taking place today have started providing local content to their communities, enabling users to search the local library's card catalog, read the local newspaper, or check bus schedules.

To ensure sufficient bandwidth, some cable companies are looking to provide high-bandwidth networks of their own. For example, Tele-Communications Inc. and Kleiner Perkins Caufield & Byers, a Silicon Valley venture-capital firm, are backers of @Home, a self-contained high-speed network that will be used to deliver proprietary content as well as provide a connection to the Internet infrastructure. Recently, @Home announced that it would be late delivering high-speed Internet access to its first test market, in Sunnyvale, California, originally planned for spring 1996.

Cable modems, the customer device for these high-speed connections, are really routers. Each one is a brick-size box with a 10Base-T Ethernet connection on one end and a proprietary cable connection on the other end. The user needs a PC with an Ethernet adapter and either a hub or a crossover cable. Cable modems include so-

Motorola BitSurfr Pro U.S. Robotics Sportster ISDN 128K

Forget the horror stories you've heard about ISDN hardware. With one exception, the ISDN adapters we tested installed with few problems and performed well.

Our first Editors' Choice, U.S. Robotics Sportster ISDN 128K, was the easiest of the three internal adapters to install and configure. Although the Sportster is not Plug and Play-compatible, we had no problems installing and configuring the card.

Because it's an internal card, the Sportster's performance was not hampered by the 115.2-Kbps maximum throughput of the serial port. On our file-transfer tests, it showed the best performance of all the products we tested. Add the Sportster's Stac-compatible TurboPPP compression technology and you can achieve throughput that's as much as six times faster than that of an analog V.34 modem. None of the other products reviewed included compression to enhance performance. We also liked the Sportster Manager software, which shows you your ISDN connection graphically, performs diagnostic tests on the line, and lets you log calls.

Unlike the other two internal adapters, the Sportster includes real analog support with an RJ-11 jack that allows you to attach an analog device such as a telephone or a modem. We had only two complaints with the Sportster: The analog jack doesn't work when

the PC is turned off—a problem common to all internal adapters—and to enable the Sportster to generate a ring you must buy a \$95 add-on product.

Our second choice, the Motorola BitSurfr Pro, was clearly the easiest of all the products to install and configure. The wizardlike Surfr Setup program had us up and running in just a few minutes. Since the BitSurfr Pro has to send data through the serial port, which has a maximum throughput of 115 Kbps, it can't deliver the full 128-Kbps ISDN bandwidth that the internal adapters provide. Still, it performed better than any

other external adapter in this roundup, and it took the least time of all the products to complete our Web Browser test.

The BitSurfr Pro is also the only product we reviewed to provide two RJ-11 jacks for connecting an analog telephone, modem, or fax machine. If your ISDN line has two phone numbers, you can program the BitSurfr Pro to route incoming calls on each number to separate RJ-11 jacks. What's more, both RJ-11 ports work as long as the unit's power is on, so you can use your analog devices even when the PC is off. Motorola also just announced the \$79 BitBrick—a small, dedicated uninterruptible power supply.



phisticated management programs that aid in billing and system maintenance. The major investors in cable modem technology include AT&T, Digital, General Instrument, Hewlett-Packard, Intel, Motorola, and Zenith. LANCity and Zenith have a lead in delivering practical products. Prices

for these devices will be in the \$300 to \$600 range, but you will probably lease them from your local cable provider along with your service and Internet connection.

Unfortunately, there are many roadblocks ahead for two-way digital cable. Our research indicates that you shouldn't put off investing in DSS or ISDN hoping for two-way cable service any time in the next several years—possibly a decade.

The MSOs and a few smaller companies have many challenges to meet, including layers of federal, state, county,

Our Contributors: LES FREED is a networking and communications writer and a frequent contributor to *PC Magazine*. STEVE RIGNEY is a contributing editor of *PC Magazine*. SHAWN F. KAFIPOUR is a senior project leader at ZD Labs. LEON ERLANGER was the senior associate editor in charge of this story, and JEFFREY G. WITT was the project leader.

Make your presence felt



HITACHI MOBILIZER

©1998 Hitachi PC Computers (USA), All rights reserved. "Mobilizer" and "Keweenaw" are trademarks of Hitachi PC Computers (USA), which may be registered in various jurisdictions. The Intel Inside logo is a registered trademark of Intel Corporation.



back at the office.

COMPUTING. REMOTE CONTROL™

HITACHI
MOBILIZER
COMPUTING

CIRCLE 082 ON READER SERVICE CARD
CIRCLE 085 ON READER SERVICE CARD

GLOSSARY

An ISDN Glossary

B-channel (bearer channel) A fundamental component of ISDN interfaces. A B-channel can carry data, voice, and video at 64 Kbps in both directions. The basic-rate interface includes two B-channels.

Basic-rate interface (BRI) An ISDN service that consists of two B-channels and one D-channel.

Bandwidth Allocation Control Protocol (BACP) A proposed extension to Multilink PPP that defines dynamic reallocation of bandwidth.

BOND (bandwidth on demand) A standard for aggregating multiple ISDN B-channels that predates Multilink PPP.

D-channel (data channel) A 16-Kbps signaling

component of an ISDN line that carries call-control information to and from the ISDN equipment.

Integrated Services Digital Network (ISDN) A digital communications service offered by telephone companies that can carry data, voice, and video over specially conditioned telephone lines.

Multilink PPP (MP) A standard for aggregating multiple ISDN B-channels using synchronous PPP framing. MP allows an ISDN adapter to combine two B-channels for a total bandwidth of 128 Kbps.

NT-1 (Network Terminator Type 1) A device that converts a two-wire ISDN line to a four-wire line, allowing multiple PC and terminal connections.

Point-to-Point Protocol (PPP) A communica-

tions protocol that provides dial-up access from a PC to an internetwork (a network of networks such as the Internet). PPP encapsulates network-layer protocols such as IP.

POTS (plain old telephone service) A colloquial reference to analog-line telephone service.

Primary rate interface (PRI) In the U.S., an ISDN service that consists of 23 B-channels and one D-channel. In Europe, PRI service has 30 B-channels.

Service Profile Identifier (SPID) The number assigned by an ISDN provider that identifies a B-channel to the network. The SPID includes each B-channel's phone number and other digits indicating switch type.

and municipal regulations; the need for massive system upgrades in order to upgrade the current one-way infrastructure to a two-way service; a lack of standards; and competing technologies.

The cable-television installations of the last two decades used coaxial cable and many repeaters spread around the community. These systems provide downstream broadcast plus a primitive form of upstream signaling used by set-top boxes to order movies and acknowledge commands. Modern two-way cable systems use a technology called Hybrid Fiber and Coax (HFC). It can deliver data downstream to an end user at speeds up to 36 Mbps and allow an upstream channel of up to 10 megabits per second (10 Mbps) with a smaller amount of field equipment. Customer service at 10 Mbps downstream and 768 Kbps upstream will probably be typical, although companies will also be able to offer customized and even point-to-point wide-area network services.

Changing to HFC technology has a high up-front cost that's difficult for many cable companies, restricted by layers of regulators, to justify. HFC's major appeal is lower maintenance costs. The two-way capability is secondary because it has no concrete revenue numbers attached. More than a dozen trial systems in communities throughout the U.S. and Canada, heavily subsidized by the equipment providers, are attempting to

qualify technologies and to quantify revenues. Two-way cable service also introduces the need for high-speed data switches, ATM, huge data-storage systems, and other cutting-edge technologies—a big stretch for most cable operators.

HFC-based cable systems could be the dominant data delivery technology in a decade. But in the interim, DSS and ISDN, and perhaps ADSL and even cellular wireless technologies, will have their day.

ADSL: A BETTER ISDN THAN ISDN?

AT&T and several regional phone companies are promoting ADSL as the next logical step beyond ISDN. ADSL was originally designed as the delivery vehicle for Interactive TV, an idea that never got off the ground. ADSL provides connection speeds ranging from 1.6 Mbps to 6 Mbps over an existing copper telephone wire. That copper wire can be an ordinary telephone wire pair—just like the millions of wire pairs that now provide ordinary telephone service. ADSL service will be offered by your local phone company.

Like cable modems, ADSL has its share of shortcomings. First, the "A" in ADSL stands for asymmetric, which in communications jargon means that it's faster in one direction than in the other. Specifically, the ADSL reverse channel—the one from you to the phone company—is 64 Kbps, half the speed of ISDN. As with DirecPC, this may

not be a big deterrent if you don't need to transmit large amounts of data.

ADSL service requires an ADSL modem at each end of the line. Because the line runs from you to the phone company, you'll need an ADSL modem that's compatible with the one used by the phone company. The biggest problem with ADSL is that it can operate only over relatively short distances. So if your home or office is more than about two miles from the phone company's switching office, you're out of luck. Wire miles are often much longer than as-the-crow-flies miles, so ADSL's coverage area is very limited. As with cable modems, you'll be locked into a single choice for Internet service, but this time it's the phone company.

The phone companies like ADSL because it's an alternative to cable modems. It puts the phone companies into the Internet-service-provider business, and generates more revenue without requiring a huge investment in equipment.

Like cable modems, ADSL is also currently available in only a few test markets. The success or failure of these field tests will determine if and when this new technology become widely available.

REALITY CHECK: ISDN

For at least the next two years or so, we think ISDN is the way to go if you need a fast, reliable connection to the Internet or

I commute from Seattle to Boston in seconds.

I got an offer to run a satellite sales office.
Aspire. To Do More.

But there was a catch — a 3,000 mile catch.

I couldn't bear the thought of leaving home.

Fortunately, my company liked the idea of
telecommuting. And that's

when I got my Acer® Aspire™

2550 Minitower. It takes

me from home to headquarters in seconds. It

has online software and a powerful fax modem

A few more things

that lets me e-mail my executive summaries to

I can Aspire to do:

corporate on time. Plus, a large hard drive, a

Order dinner from a local restaurant.

high-speed CD-ROM drive and stereo speakers

Negotiate contracts online.

that really jazz up my multimedia presentations.

Manage my company stock options.

And because my Aspire 2550 Minitower has an

Keep up with my business journals.

Intel® Pentium® processor, I have just as much

Comparison shop for designer clothes.

computing power as my colleagues at the office.

And cruise the Internet.

Now I can have my latte at work just the way

I like it—while working from home.



Acer  *Everything You Aspire To.*

Acer and the Acer logo are registered trademarks and Aspire is a trademark of Acer America Corporation and Acer Inc. The Intel Inside logo and Pentium are registered trademarks of Intel Corporation. Microsoft, Windows and Windows logo are registered trademarks of Microsoft Corporation. All other brands and product names are trademarks or registered trademarks of their respective companies. © 1996 Acer America Corporation. All rights reserved. Specifications vary by model and configuration, are subject to change without notice, and not all models/options available at all retail locations. See your local retailer for more information and details on Acer's Limited Product Warranty.



Designed for



For the location of the Acer dealer nearest you,

call 1-800-529-ACER. Or visit us on the World Wide

Web at <http://www.acer.com/aac/>

CIRCLE 035 ON READER SERVICE CARD

Should You Turbocharge Your Telecommuters?

By Steve Rigney

For the main roundup, we reviewed ISDN adapters as vehicles for joy-riding around the World Wide Web. But ISDN today is also commonly used to connect workers at home to the corporate LAN—the virtual company car. Here we look at some of the advantages and disadvantages of using ISDN as a remote-access solution compared with analog solutions. We'll cover the most frequently asked questions and give you some insight on what the ISDN vendors are doing to make your life easier.

■ Is ISDN more expensive than using analog phone lines?

Not surprisingly, cost is the most common concern when people consider using ISDN for remote access. The first expense to factor in is the cost of ISDN service from the telephone company or other provider. Monthly rates for ISDN range from \$19 a month in some areas of California to \$60 a month in the Northeast. But unlike analog phone service, phone companies typically bill ISDN usage by the minute even for a local call. The connect charges are inexpensive—usually about one or two cents per minute—but they can add up if you use the line frequently. And if you establish a long-distance connection, the ISDN tariff rate goes up.

To keep usage costs down, vendors such as Ascend, Gandalf, and Shiva have implemented a feature in their products known as *tariff* or *bandwidth management*. You can configure these products to connect only when the remote user is accessing data on the network and to disconnect when working locally. Because ISDN has a fast call-setup time, users don't notice when a connection is reestablished.

The second expense you need to be aware of is the cost of upgrading to ISDN hardware. You have to invest in a remote-access server that provides ISDN connections, and every remote user needs an ISDN adapter or an

ISDN bridge/router. You should expect to pay about \$8,000 to \$9,000 for a central-site server with eight BRI ISDN connections (such as the Ascend MAX 1800). Remote-client hardware such as the adapters in our main story cost approximately \$400 to \$600. While this is more expensive than an analog solution—an eight-port analog remote-access server with modems costs about \$6,000; a 28.8-Kbps modem costs about



\$300—the increased performance could pay for itself if your telecommuters can get their work done faster.

■ Do I have to purchase my remote hardware and central-site server from the same vendor?

Most ISDN remote-access vendors allow you to use almost any vendor's remote client ISDN hardware. As long as the client adapter and the central-site router conform to the same standards, such as PPP or Multilink PPP, you should not have any problems mixing and matching boxes. On the other hand, some additional features—such as advanced security and data compression—are usually available only if you use the vendor's product on both sides of the line.

■ Can remote users access online services in addition to the office network with their ISDN adapters?

Thanks to the standards mentioned above, anyone should be able to use the ISDN equipment at home to connect to the Internet and online services

that offer ISDN access. You can also use your adapter for such other tasks as videoconferencing, though most PC-based videoconferencing solutions require their own proprietary ISDN cards.

■ Should I give ISDN access to all of my remote users?

Because of the higher cost of ISDN compared with analog solutions, you should reserve your ISDN connections for remote users that absolutely need the faster performance. For example, an engineer who is constantly sending large CAD drawings from home will benefit from an ISDN connection more than a sales representative who only needs to check e-mail. Depending on the ISDN tariffs in your area, you may decide to give ISDN to all remote users who spend most of their day using a PC.

But you don't have to choose to convert to ISDN all at once. Vendors such as Ascend, Microcom, and U.S. Robotics offer central-site servers configurable with both ISDN BRI cards and analog modems. This lets you manage one network component for all of your remote access needs.

Another problem in adopting ISDN access en masse is the more limited availability of ISDN service compared with analog phone service. Although it's become much more widely available in the past year, ISDN is still not available in some areas. Similarly, if you support users who travel, chances are they will be at a loss to find a hotel room with an ISDN connection.

■ Is implementing ISDN for remote access going to cause problems for the IS staff?

It's much harder to install an ISDN connection than a standard analog phone line. While the phone companies have made this task easier, it can still take a long time to provision ISDN lines and get them operational. Apart from installation, you shouldn't encounter any additional management and service problems with ISDN as long as you standardize on interoperable hardware and software.

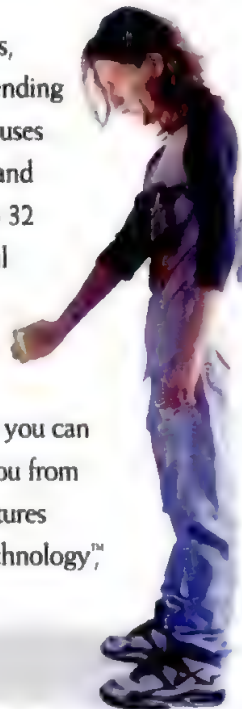
A breakthrough in sound so real, your PC will have its own groupies.



Systems, the professional audio experts, inside your PC. It delivers the mind-bending realism of wave-table synthesis—which uses actual recordings of real sound effects and musical instruments. And it plays up to 32 notes simultaneously, adding new detail and richness to your favorite games and software.

AWE 32 is the first sound card that supports 3D Positional Audio™, so you can hear those dueling guitars coming at you from different places in the room. It also features Creative's 3D Stereo Enhancement Technology™, which makes your whole system sound richer and more powerful.

(Our apologies to the neighbors.)



Our downloadable SoundFont® technology lets you add new sounds and instruments to your card. Add up to 28 MB of memory to create your own audio library. We even included a microphone and software for recording music and sound effects. And, of course, the AWE 32 is fully Plug and Play and works with Windows® 95, Windows 3.1 and DOS. So installation is a

no brainer. Check out our new line of Sound Blaster® Speakers, sold separately at your local dealer

complete your multimedia dream system? Pick up the new Blaster CD™ 8x CD-ROM and Sound Blaster Speakers too, at your nearest Creative Labs dealer. But take along your



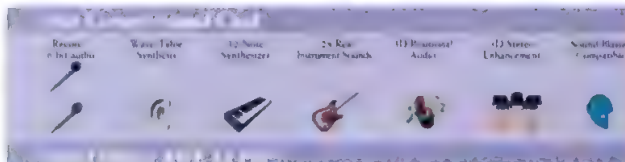
The crowd keeps growing until they have your house surrounded.

Then the chanting begins. "A-W-E...A-W-E...A-W-E."

It seems that Sound Blaster® AWE 32™ PnP is the first sound card to develop its own cult following. That's because it makes every other sound card seem like a blast from the past.

The AWE 32 puts professional sound technology from E-mu®

Sound Blaster AWE32 PnP. Hear What You've Been Missing



bodyguard, in case the groupies get carried away.

www.creativelabs.com



CREATIVE
CREATIVE LABS, INC.

ISDN ADAPTERS

How to Read the Suitability to Task Boxes

For our **Internet and online connectivity** rating, we consider the product's ease of installation. We look for adapters that offer step-by-step configuration scripts, ISDN line instructions, and Microsoft Windows 95 Plug and Play. Products must work with Windows 95 TCP/IP stack or bundle a third-party stack. We give extra consideration to products that include useful diagnostic tools and compression algorithms compatible with common ISDN routers. Finally, we award higher ratings to products that bundle software for easily setting up Internet accounts.

to a LAN router. ISDN is more flexible than ADSL or cable modems, it's available today nationwide, and you have a choice of ISDN Internet service providers.

ISDN provides two 64-Kbps digital channels, called B-channels, that can carry data or voice. These are real, reliable, two-way, connect-every-time 64-Kbps channels. The two B-channels combine with another 16-bit channel called the D-channel, which carries call-control and signaling information, to form the basic rate interface (BRI). Another ISDN service, called the primary rate interface (PRI), uses one D-channel and 23 B-channels in the U.S. (or 30 B-channels in Europe), but is mainly used for corporate connections.

ISDN calls connect in a few tenths of a second, and there is no modulation protocol handshaking period as there is with analog modems.

Each channel can place a call independently of the other, and each can have a separate phone number. Most ISDN products and all of the products we reviewed for this story can also combine the two channels into one 128-Kbps connection. ISDN error-checking is done in the hardware, so no bandwidth is lost to error-correction protocols.

In most cases, you can replace two analog telephone lines with one ISDN line. The cost of an ISDN line varies widely nationwide but is usually lower than or equal to the price of two analog lines.

Early users of ISDN had to endure complicated ordering procedures, equipment installation nightmares, and isolated connectivity. It was often impossible to

SUITABILITY TO TASK	
Internet and online connectivity	Fair
Small-office use	Good

We evaluate the products for **small-office use** by judging the ISDN adapter's ability to integrate digital and analog communications for data, voice, and fax. The adapters should use dual B-channels for simultaneous voice and data. More flexible adapters provide RJ-11 jacks for hooking up a phone, fax machine, or modem. We also consider which adapters include integrated modems.

connect to other ISDN users outside a small, local calling area. Long-distance ISDN service was spotty and expensive. One vendor's equipment couldn't communicate with another's.

That situation has changed quickly because the demand for faster, more reliable communications has greatly increased demand for ISDN service. The regional phone companies—smelling a new source of revenue—have become more responsive to customer demands for ISDN service. ISDN equipment makers got the message too—new-generation ISDN equipment is as easy to install and use as a modem. To ease the line-ordering process, most equipment vendors now provide an ISDN Ordering Code (IOC) that you give to your local phone company to tell them how to configure the line.

As we were preparing this article, Microsoft jumped onto the ISDN bandwagon with a new program called Get ISDN for Microsoft Windows. Microsoft's Get ISDN Web page (<http://www.microsoft.com/windows/getisdn>) makes ordering an ISDN line almost painless. You fill out an on-screen form describing your location and needs, and Microsoft relays the request to your local phone company in terms the phone company can understand. In many locations, you can have ISDN installed a few days after placing the order. Several ISDN equipment vendors—including industry leaders Motorola, 3Com, and U.S. Robotics—also offer no-charge ISDN installation assistance programs. (See the sidebar "Getting Connected.")

With its Get ISDN for Microsoft Win-

dows program, Microsoft also announced native ISDN support in Windows 95 via the ISDN Accelerator Pack, which is also downloadable from Microsoft's Web site. The Accelerator Pack uses the built-in dial-up networking capabilities of Windows 95, supports remote access to TCP/IP networks, and works with any networked Windows 95 application. It also comes with Internet Explorer 2.0.

REVIEW CRITERIA

To use ISDN on your PC, you'll need a terminal adapter, or TA. The TA is the ISDN equivalent of a modem, and some TA makers confuse the issue by calling their products "ISDN modems." This is technically a misnomer, because with a digital connection there is no signal modulation or demodulation.

We took a close look at six ISDN terminal adapters—three internal and three external—from Adtran, ISDN*tek, Mitsubishi, Motorola, 3Com, and U.S. Robotics. Boca Research, Farallon, and ZyXEL have announced similar products, but none were shipping as of our testing deadline.

We concentrated on ISDN products aimed at the small- and home-office markets, since that's where the action is in the ISDN marketplace today. Specifically, we concentrated on products that can connect to an ISDN-capable Internet service provider, as well as to an ISDN router attached to a corporate LAN. These products allow you to use one ISDN terminal adapter for Net cruising and remote LAN access. (See the sidebar, "Should You Turbocharge Your Telecommuters?") If you also plan to use ISDN for PC-based videoconferencing, you'll probably end up installing another card; virtually every PC-based videoconferencing system provides as part of the package an ISDN adapter, as well as software that works only with its own adapter.

Because of ISDN's limited availability, mobile users will find it difficult to connect remotely via ISDN. A few PC Card (formerly PCMCIA) ISDN adapters are on the market, including IBM's WaveRunner, but they usually require a bulky, external NT-1. Eicon Technology plans to ship an ISDN PC Card with an integrated NT-1 by mid-year.

Another class of products—ISDN LAN

NOW THERE ARE TWO
MACHINES ENGINEERED
TO RULE THE ROAD...



THE MICRON MILL

133MHz INTEL MOBILE PENTIUM® PROCESSOR

combined with 256KB of pipelined burst cache and 16MB of EDO memory provide the high level of performance you've come to expect from Micron.

Two PCMCIA SLOTS

hold either two Type II or one Type III device. Handles a wide variety of communications and storage options.

4X MODULAR CD-ROM

provides fast access to a whole new world of information.

11.3" ACTIVE MATRIX DISPLAY

shows you the big picture in vivid 800 x 600 color.

PCI GRAPHICS ACCELERATOR

provides blazing graphic performance with VGA, S-Video, and NTSC video outputs.

DUAL INFRARED PORTS

provide convenient IRDA-compliant wireless connection in front or in back.

SOUNDBLASTER™ 16 SOUND

delivers 16-bit stereo sound to two integrated stereo speakers for the complete multimedia experience.

REMOVABLE 1.2GB DRIVE

gives you vast amounts of storage and allows you to upgrade to a larger hard drive in the future.

LITHIUM-ION BATTERY

Intelligent modular lithium-ion batteries give you the power to complete the job. Add a second modular battery in bay two and double your productivity.

DUAL POINTING DEVICES

The Pick-a-Point™ offers two pointing devices; choose either the touchpad or the pointing stick.

MODULAR BAY #2:

Intelligent lithium-ion battery
or

4X CD-ROM drive

or

2nd 1.2GB hard drive

or

3.5" floppy drive

MODULAR BAY #1:

Intelligent lithium-ion battery

or

3.5" floppy drive



ENNIA TRANSPORT IS ONE OF THEM.

Powerful desktop computing, built for the road.

The Micron Millennia TransPort gives you the right combination of performance, standard features and options to match the best of desktop PCs. It's a no-compromise PC for the office or the road.

Flexible features, made for the way you work.

Micron's exclusive FlexOpt™ feature set includes two bays for your choice of seven notebook configurations. Drop in a modular quad speed CD ROM drive. Add a second intelligent modular lithium-ion battery, or 1.2GB hard drive to boost productivity. And count on intuitive features like Micron's innovative Pick-a-Point™ system that lets you choose either touchpad or pointing stick operation.

Engineered for performance.

A 133MHz mobile Intel Pentium® processor plus pipelined burst cache and EDO memory give you the power you need to take your show on the road at record speed.

Product protection that's second to none.



Micron is so confident in the design and construction of the Millennia TransPort that we offer an industry first—the Micron PowerSM warranty*. It includes a five-year limited warranty on the microprocessor and main memory and a three-year limited parts-only system warranty.



On the road to stardom. Just ask the experts.

Outstanding feature set:

"Replace your desktop PC and your notebook with the Millennia TransPort? It just might be an even trade."

—Windows Sources, April 1996

"By all accounts . . . a dead-ringer for IBM's ThinkPad . . . but performs better and saves you about \$2,500."

—PC Magazine, April 9, 1996

Breakthrough performance:

"If you have a 75, 90 or 100MHz Pentium PC on your desk, it will fairly crawl compared to Micron's Millennia TransPort."

—PC World, March 1996

"The Millennia TransPort, a bench-burner of a notebook . . . delivered the highest Winstone 96 score we've ever seen on a notebook: 53.3". —Windows Sources, April 1996



800-250-5714

<http://www.mei.micron.com>

MICRON
ELECTRONICS, INC.

DESKTOP READY

*"An excellent entry
into the mobile
Pentium fray.
Micron's Millennia
TransPort offers a
solid blend of
features, performance
and design."*

—Windows Sources, April 1996

Millennia TransPort P133

Standard Features

- 133MHz Mobile Intel Pentium® processor
- Intel 430MX PCIset
- 256KB L2 pipelined burst cache
- 4X modular CD-ROM drive
- 11.3" active matrix color display, 800 x 600
- PCI graphics accelerator, 1MB RAM
- Pick-a-Point™ dual pointing devices
integrate both pointing stick and touchpad
- Removable EIDE hard drive (1.2GB max.)
- 3.5" modular floppy drive
- Intelligent modular lithium-ion battery
- SoundBlaster™ 16-bit stereo sound
- Built-in stereo speakers and microphone
- 2 Type II or one Type III PCMCIA slots
- S-Video and NTSC video-outputs
- Headphone, microphone and line-in jacks
- 2 infrared ports, one front, one back
- Parallel, serial, VGA and 2 PS/2 ports
- Dimensions: 11.7" x 9.4" x 2.0", Weight: 6.9 lbs.†
- Nylon carrying case
- Microsoft® Windows® 95 CD & MS Plus! CD
- Microsoft Office Pro 95 and Bookshelf 95 CDs
- 5-year/3-year Micron Power™ warranty*

- A** • 32MB EDO memory (48MB max.)
- 1.2GB removable hard drive
 - 2nd intelligent modular lithium-ion battery
 - Motorola® Montana 28.8 fax/modem
- \$5,799** Business lease \$182/month

- B** • 16MB EDO memory (48MB max.)
- 1.2GB removable hard drive
 - 2nd intelligent modular lithium-ion battery
- \$4,899** Business lease \$167/month

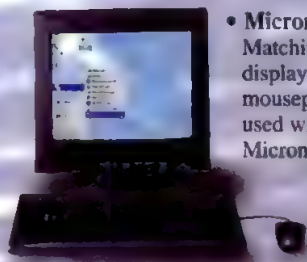
†6.9 lbs. includes 3.5" floppy and one battery.



Options



- **MicronDock™ multimedia port replicator:** Ethernet LAN adapter, SCSI-2 port, S-Video and NTSC video outputs, built-in stereo speakers, infrared port, head-phone, microphone, line-in jacks, parallel, serial, VGA and 2 PS/2 ports.....**\$299**



- **MicronExec™ desktop package:** Matching black 17" monitor (15.8" display) with matching black mouse, mousepad and keyboard (can be used with or without MicronDock).....**\$799**

- Motorola Montana 28.8 fax/modem supports regular telephone connections, cellular phones and two-way paging devices.....**\$179**
- 2nd intelligent modular lithium-ion battery.....**\$149**
- 2nd 1.2GB modular hard drive (2.4GB total).....**\$899**
- 16MB EDO memory upgrade.....**\$699**
- Leather carrying case upgrade.....**\$59**



*MICRON POWER™ WARRANTY & SUPPORT

- 5-year limited warranty on microprocessor and main memory
- 3-year limited parts-only system warranty
- 30 days of free Micron-supplied software support
- 30-day money-back policy
- 24-hour technical support

All sales are subject to Micron's standard limited warranties and terms and conditions of sale. Copies of the Micron warranties may be obtained by calling Micron.



800-250-5714

<http://www.mei.micron.com>

MICRON
ELECTRONICS, INC.

900 E. Karcher Road, Nampa, ID 83687

Mon-Fri 6am-10pm Sat 7am-5pm (MT) • 24-hour technical support
208-893-3434 • Fax 208-893-3424 • Purchase Order Fax 208-893-8992

© 1996 Micron Electronics, Inc. All rights reserved. All prices and specifications subject to change without notice. Micron Electronics, Inc. is not responsible for omissions and/or errors in typography or photography. Micron Power is a service mark. Millennia TransPort, Pick-a-Point, MicronDock, MicronExec and FlexOpt are trademarks of Micron Electronics Inc. Intel, Intel Inside and Pentium are registered trademarks of the Intel Corporation. Microsoft is a registered trademark and Windows 95 and the Windows logos are trademarks of Microsoft Corporation. All other company trademarks are trade names of each respective company. Prices do not include shipping and handling. 30-day money-back policy does not include return freight and original shipping/handling charges. Applies only to Micron brand products and begins from date of shipment. All returns require RMA numbers and must be shipped in the original condition prepaid and insured. Prices based on 36-month lease.

TRANS-PCMG-9605A

Another Route to ISDN

By Jeffrey G. Witt

The terminal adapters in our main review do a good job of providing single users with fast Internet connections. If you want to connect multiple users, you'll most likely want to step up to an ISDN router. Shared ISDN routers can be very cost-effective for a small-office network.

ISDN routers attach to the LAN via a hub or a single network adapter, and they connect networks via ISDN lines.

We tested three ISDN routing solutions: the \$895 Ascend Pipeline 25 (800-272-3634); Gandalf's \$1,550 XpressConnect LANLine 5242i (800-426-3253); and Livingston's \$1,195 PortMaster ISDN Office router (800-458-9966). Each of these routers has one ISDN BRI port (two B-channels plus one D-channel) with a U interface, one Ethernet port, and one asynchronous port for a management console or external modem connection. All of them can connect remote sites to TCP/IP networks, such as the Internet, via ISDN. They can also route additional protocols, including NetWare's IPX.

In addition to the standard interfaces, the Pipeline offers two standard RJ-11 jacks, and Gandalf's LANLine includes one RJ-11 jack for connecting analog phone and fax devices. Both routers can give the analog devices on-demand access to one of the B-channels while the other B-channel remains connected to the ISDN network. So, for example, if you're connected to the central site with both B-channels and you need to send a fax, the router will take down one of those B-channels and allow the fax machine to dial out.

At press time, we learned that Ascend has plans to replace the Pipeline 25 with two new router products: the Pipeline 25 FX (\$595), for up to four users on the LAN, and the Pipeline 25 PX (\$695), for a single user. Both have two RJ-11 jacks plus

serial and Ethernet ports. The Pipeline 25 PX does not require its own IP address.

Each router attached to the same test-bed that we used for the ISDN adapters in the main review. First we connected a client PC with an Ethernet adapter to each of the three routers and linked with our central-site Ascend MAX 4000 router over a single B-channel using PPP with no compression. The products filled the 64-Kbps pipe effectively on our FTP file-transfer test using a highly compressible graphics file: The LANLine delivered 63 Kbps; the Pipeline, 59



ROUTE IT OUT: The Ascend Pipeline 25 (left), Gandalf's LANLine 5242i (right), and Livingston's PortMaster ISDN Office (bottom).

Kbps; and the PortMaster, 53 Kbps. Ethernet, which runs at 10 Mbps, produces no bottleneck from the client to the ISDN router (as opposed to an external serial-port ISDN device, which has a 115.2-Kbps maximum throughput).

For dual-B-channel connections over Multilink PPP (MP) we were unable to connect the PortMaster because the product's management software did not allow us to enter our second BRI number. Livingston is developing software to allow a dual-B-channel connection. The LANLine and Pipeline 25 negotiated MP links

with no problem, offering throughput of 115 Kbps and 105 Kbps respectively.

Beyond multiple-user access, an added benefit of the router approach is that ISPs use these same vendors' ISDN products at their central sites. While the market waits for performance-enhancing compression standards, you may want to base your router purchase on the equipment your ISP uses in order to get the performance advantage that proprietary compression can provide.

When we enabled the Stac-based compression in the Ascend Pipeline, we saw remarkably improved performance over both single- and dual-B-channel connections to our central-site Ascend MAX. The Pipeline transferred the same highly compressible file at 220 Kbps, more than three times as fast as the Pipeline did without compression.

Each unit can be configured through the serial port using a terminal-emulation session via standard communications software (such as the Windows 95 HyperTerminal). The interfaces are text-based and can often be cryptic on first use. Gandalf and Livingston both offer Windows-based configuration utilities that ease some of the burden, but you still must be familiar with IP addressing to get them working.

A network administrator, however, will find managing a single router much easier than dealing with a number of single-user solutions, even on a small network. Managers of larger organizations who are equipping branch offices with an ISDN router can configure it in advance and get those users up and working quickly.

For any type of Internet access you'll need to work closely with your ISP. All three of the routers require static IP addresses (as opposed to IP addresses that are dynamically assigned when you dial in), and you'll need to make sure that your ISP can provide you with one.

PRESENTING SOFTWARE BEINGS IN PARALLEL UNIVERSES AND BROWSE THE

(THAT'S UNDER DEVELOPMENT. IN THE MEANTIME,
YOU CAN'T GET MORE ADVANCED COMMUNICATIONS SOFTWARE
THAN NEW DELRINA COMMSUITE 95 FOR WINDOWS 95.)

If you're like most people, less than one percent of all your friends and business associates reside in parallel universes. Which means that new Delrina CommSuite™ 95 should suit you just fine. ☎ It's the complete, affordable, integrated communications solution for Windows® 95, featuring breakthrough programs that fully

exploit Windows 95's multitasking, multithreading, 32-bit capabilities. ☎ New Delrina WinFax™ PRO 7.0 is the easiest and most powerful version ever of the



world's best-selling fax software. You get true background faxing and greater speed. It cuts faxing time by up to a third. It has gray-scale quality faxing, new improved OCR, integrates with MS®

\$99*

Exchange, 101 ready-to-use cover sheets and tools to design your own. With the TalkWorks™ telephony option and your voice modem, WinFax PRO turns your computer into a voice mail system that takes messages, distinguishes between fax and voice calls, has Fax on Demand, and an integrated in-box for faxes, voice messages and e-mail.



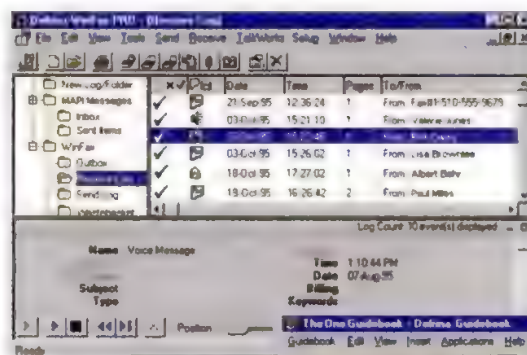
Delrina, WinFax, Cyberjack, WinComm, TalkWorks, CommSuite, Guidebook, and CommBar are trademarks of Delrina. Microsoft and Windows are registered trademarks of Microsoft Corporation. All other product names are trademarks of their respective owners. © 1995 Delrina. All rights reserved. * Estimated street price. Price subject to change. Limited time offer. See dealer for details.

For information about Delrina CommSuite 95, WinFax, Scanbox, CommSuite for Novell and WinFax PRO

E THAT LETS YOU FAX VERSES, E-MAIL CLEOPATRA INTERGALACTICNET.

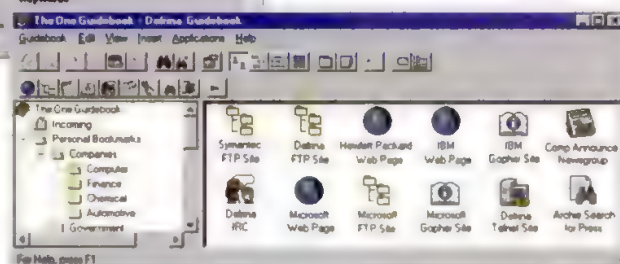
New Delrina Cyberjack™ 7.0 makes the Internet as easy to use as a TV remote. The revolutionary new Cyberjack Guidebook™ will connect you to hundreds of the hottest Net sites with one click, and can be updated by connecting to Delrina's Internet server. Plus, you get all the Net tools you need — Web, News, FTP, IRC, Gopher, Archie, Telnet — in a singularly sane interface to the multiple personalities of the Net. Locate Web sites, take part in news groups and chat lines, keep up with stock quotes and NASA news — whatever you want — with phenomenal ease and speed.

New Delrina WinComm™ PRO 7.0 speeds you to BBSs and on-line services with a couple of mouse clicks. It has an image viewer, Zip manager and Norton™ virus



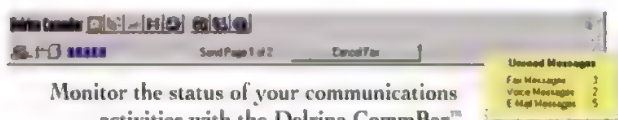
With TalkWorks, the WinFax PRO telephony option, all of your messages - faxes, e-mail and voice mail - come together in one convenient place.

The Cyberjack Guidebook organizes your favorite Internet sites in one place and comes with hundreds of popular sites.



detection built-in. It even lets you download files in the background. All in all, it's the perfect communications solution for Windows 95. And if you can't e-mail Cleopatra, don't despair. These long distance relationships seldom work out anyway.

DELTRINA
CIRCLE 316 ON READER SERVICE CARD



Monitor the status of your communications activities with the Delrina CommBar™

routers—provide a remote LAN Ethernet connection for one or more PCs (see the sidebar “Another Route to ISDN”).

The products we tested all support the Point-to-Point Protocol (PPP), which is widely used to connect modems and ISDN TAs to remote LAN routers. They also support Multilink PPP, or MP, a recently published Internet Engineering Task Force (IETF) standard that allows you to combine the bandwidth of both ISDN B-channels into one 128-Kbps con-

nection. Any two ISDN devices that support the MP standard can talk to each other over two bonded B-channels. Currently there is no standard for dynamic bandwidth allocation, which would dynamically adjust bandwidth to one or two channels during a single session depending on need. Ascend Communications, a major vendor of ISDN routers, has its own standard, MP+, for this purpose. Later this year the IETF is expected to publish the Bandwidth Allocation Con-

trol Protocol (BACP), which is likely to become widely accepted by ISDN adapter and router vendors.

There are two types of ISDN connectors: U interface and S/T interface jacks. Phone companies always provide a U interface jack, the direct connection to the ISDN line. Unlike regular phone lines, you can have only one device connected to the U interface at any time. To connect your equipment to the ISDN line, you need a device called a Network Termina-

PERFORMANCE TESTS

ISDN Adapters



Internal ISDN adapters delivered much better throughput than the external adapters, which hit a bottleneck at the PC's serial port.

But both types of adapters left analog modems eating dust.

What the Numbers Mean

The internal adapters—the ISDN*tek CyberSpace Internet+Plus Card, the Mitsubishi NetViper, and the U.S. Robotics Sportster ISDN 128K—clearly outpaced their external brethren, the Adtran ISU Express, the Motorola BitSurfr Pro, and the 3Com Impact. Of the internal adapters, the Sportster's TurboPPP Stac-compatible compression gave it the best performance overall on our Throughput tests.

External ISDN adapters use the same kind of serial-port connection as their analog counterparts. A serial connection offers sufficient bandwidth on a single 64-Kbps B-channel, but because a serial port has a maximum 115.2-Kbps data rate it becomes a bottleneck when both B-channels are used together. Since they don't have to pass data through a serial port, the internal ISDN cards each performed as much as 40 percent better than the external adapters on our FTP file transfer

tests. On the other hand, although external ISDN adapters were simple to install and configure, we encountered significant installation problems with two of the internal adapters—the ISDN*tek and the Mitsubishi.

All of the ISDN products, though, offer considerable performance advantages over analog modems. Our tests showed that ISDN adapters were three times as fast as a 28.8-Kbps modem on the single-B-channel Throughput test and up to six times as fast with two B-channels. Accordingly, on our Web Browser test all the ISDN adapters beat the V.34 modem, which took almost twice as long to complete the script.

On our two-B-channel Throughput tests, the internal adapters outpaced the external, but performance was similar within each group. On our test-bed, the adapters connect to the central-site router using Multilink Point-to-Point Protocol (MP), which allows ISDN devices to multiplex both BRI B-channels. Although MP offers no compression standard for file transfer, much of the content on the World Wide Web is already compressed with slow links in mind.

Our Throughput test for one B-channel showed about the same performance for both internal and external adapters—except for the Sportster ISDN 128K, which showed huge performance gains using its TurboPPP Stac-compatible compression. With the single B-channel, adapters connect using the Point-to-Point (PPP) protocol. Like MP, PPP does not define a standard for compression. The Ascend MAX 4000 router we used on our test-bed uses a proprietary, Stac-based compression algorithm; of the adapters we tested, only the Sportster supports a compatible algorithm. Connected with just a single B-channel, the Sportster outpaced the other adapters on both the single B-channel and the dual-channel tests with compressible data. We weren't able to get the Sportster's

THROUGHPUT, TWO B-CHANNELS

	Noncompressible random file Kbps	Slightly compressible executable file Kbps	Moderately compressible text file Kbps	Highly compressible graphics file Kbps
Adtran ISU Express	42.7	53.0	80.0	79.2
ISDN*tek CyberSpace Internet+Plus Card	102.4	109.7	111.3	116.4
Mitsubishi NetViper	102.4	109.7	111.3	118.2
Motorola BitSurfr Pro	78.8	80.8	82.6	85.3
3Com Impact	77.6	78.8	80.0	83.5
U.S. Robotics Sportster ISDN 128K	113.8	109.7	116.4	118.2
Standard V.34 28.8-Kbps modem*	19.7	20.5	32.4	42.2
	BETTER ►	BETTER ►	BETTER ►	BETTER ►

* Reported for comparison

CONNECTIVITY

ISDN Adapters

tor, or NT-1. External NT-1 devices have several RJ-45 connectors, one for the ISDN line (the U interface) and as many as seven S/T interface jacks for connecting your ISDN equipment.

Each of the products we tested has a built-in NT-1 device, meaning that you can connect the adapter directly to the ISDN line with no additional hardware.

One of the major benefits of ISDN is its ability to provide voice and data communications on a single line. All of the products

we reviewed provide some sort of voice support, some better than others. The Adtran, Motorola, and 3Com external TAs and the U.S. Robotics Sportster internal adapter all provide one or two RJ-11 analog telephone jacks. You can use these jacks to connect ordinary analog phones, fax machines, and modems to the ISDN line. The ISDN*tek and the Mitsubishi each provide a handset jack, allowing you to place and receive voice calls by using a dialer application running on the PC. These

jacks are less flexible than the others, because you can't use them to connect external telephone devices to the ISDN line.

Like modems, terminal adapters come in internal and external versions. The three external products we tested all connect to a PC via an RS-232C serial port. Unfortunately, the serial port's 115.2-Kbps maximum speed is less than ISDN's 128-Kbps, making it a less-than-optimal way to connect a TA to a PC. ISDN provides a synchronous communications link,

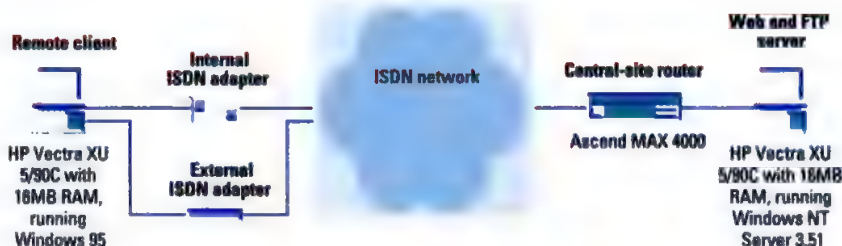
TurboPPP to work with the Ascend MAX's compression connected with two B-channels.

Our Web Browser test showed little difference between internal and external ISDN products in terms of browsing from one static page to another. But users will probably find the internal adapters a better bet in the long run as a greater number of bandwidth-intensive, multimedia Internet applications become available.—*Analysis written by Jeffrey G. Witt*

How We Tested

Our ISDN performance testing simulates two Internet activities: transferring files via FTP and browsing a graphical Web page. On our test-bed, the remote client was an HP Vectra XU 5/90C running Windows 95 and Netscape Navigator 2.0, and the server was a similar machine running Windows NT Server 3.51. We ran the FTP server included with Windows NT Server for the file-transfer tests, and we loaded Netscape Communications Server 1.1 for the Web Browser test. To simulate an Internet service provider, we used National ISDN-1 lines connected to an Ascend MAX 4000 router with multiple BRIs. We configured the Ascend MAX with PPP and MP in order to receive both single and dual B-channel calls. We configured the external ISDN adapters with the Windows 95 TCP/IP stack and the internal adapters with the provided Net-Manager TCP/IP stack.

On our **Throughput** tests, we first dial out on a single B-channel and establish an FTP session. We then transfer four file types—a non-compressible random file, a slightly compressible executable file, a



moderately compressible text file, and a highly compressible graphics file—from the Windows NT Server and record the transfer times for each. We divide the resulting transfer times by file size to determine rates of throughput. We then repeat the file transfer tests using two B-channels for each of the adapters. For comparison purposes, we ran the same file transfer tests with U.S. Robotics' Courier V. Everything analog 28.8-Kbps modem dialing the Ascend MAX router, which senses analog calls and falls back to the slower V.34 mode.

The **Web Browser** test consisted of a Microsoft Test 3.0 script that launched Netscape Navigator 2.0 and requested five different Web pages with varying amounts of graphics from the Netscape Web server software loaded on our Windows NT server. The five HTML pages ranged from a text-only page to pages with various mixtures of text and graphics to a graphics-heavy page taking up 200K on its own. The script moved from page to page, scrolling from top to bottom. We measure the time it takes each ISDN adapter to complete the test script connected over two B-channels. Again, we performed the same test with the Courier V. Everything 28.8-Kbps modem for comparison.

THROUGHPUT, ONE B-CHANNEL

Noncompressible random file

Kbps
56.9
56.9
56.9
58.0
56.9
60.2
19.7

BETTER ➤

Slightly compressible executable file

Kbps
59.1
59.1
59.1
58.7
59.1
90.4
20.5

BETTER ➤

Moderately compressible text file

Kbps
59.5
59.5
59.5
59.0
58.2
134.7
32.4

BETTER ➤

Highly compressible graphics file

Kbps
60.0
61.0
61.0
60.1
59.1
264.8
42.2

BETTER ➤

WEB-BROWSER TEST

Minutes:seconds

0:55
0:48
0:46
0:45
0:50
0:47
1:24

➤ BETTER

Why the best multimedia monitors are also the best internet monitors.



The features that make ViewSonic monitors the perfect choice for multimedia also make them the perfect choice for the internet.

Consider the many advantages of the ViewSonic 17GA (16.0" viewable) and 15GA (14.0" viewable) PerfectSound™ multimedia monitors. They're the recognized leaders in affordable high performance screen technology with .27mm dot pitch, Super Contrast screens and ARAG® anti-reflection, anti-glare coating—all of which contribute to richer colors and overall sharper, brighter, more detailed images from center screen to corner. Producing resolutions up to 1,024 x 768 at 85 Hz provides flicker-free images, reducing fatigue and eye strain. Dual bezel integrated speakers deliver full, rich stereo sound while saving desktop space. There's even volume and mute controls to let you listen without distracting others. There's also a built-in microphone,* headphone jack, and external microphone port. For added convenience, OnView™ controls let you make image, audio and color adjustments via a simple on-screen menu.

Your windshield on the information superhighway.

As the internet continues to grow and fulfill its potential with more sophisticated graphics and real-time sound, you'll appreciate these same ViewSonic multimedia monitors even more.

When it comes to applications like spreadsheets, word-processing, charts, graphs, business suite



software or multimedia presentations, again these monitors are the perfect solution.

ViewSonic has a full line of monitors ranging from 14" to 21" (various viewables) and each comes with a limited 3 year warranty on CRT, parts and labor. We also offer an optional Express Exchange® Service program that insures 48 hour replacements.

Top-rated time and time again.

How's this for high praise?



Home PC, in the April '96 issue, included the 17GA in their Top 100 Hardware Products.



MacUser magazine, in their December '95 issue, named the 17GA its Best Buy and in their March '96 issue, gave the 15GA a coveted Four Mice rating.



Windows magazine, in their December '95 and April '96 issues, "recommended" the 17GA.



February '96 issue of PC Graphics and Video "Highly Recommended" the 17GA.

Call 800-888-8583 and ask for agent 7026 for a dealer where you can see and hear the ViewSonic monitors that are the best of all possible worlds. And be sure to visit us on the internet <http://www.viewsonic.com>.

Model	15GA	17GA
CRT Size	15" (14.0" viewable)	17" (16.0" viewable)
Dot Pitch	0.27mm	0.27 mm
Max. Resolution	1280 x 1024	1280 x 1024
Recommended Resolution	1024 x 768 @ 85 Hz	1024 x 768 @ 85 Hz
*Integrated Sphrs./Mic.	Yes	Yes
TCO Low Radiation	Yes	Yes



and synchronous data doesn't require start and stop bits. But a PC's asynchronous serial ports do. When you factor in the additional overhead for start and stop bits, the PC's serial port throughput drops to a maximum of 92 Kbps!

Internal TA products bypass this problem by using I/O mapping and/or DMA transfer techniques to move data between the TA and the CPU, much like a LAN adapter card. In fact, some ISDN adapters include NDIS and ODI drivers for NetWare and Windows, allowing use of the ISDN card as a remote LAN connection.

The serial-port bottleneck is most apparent when connecting with two B-channels. In our testing, the internals and externals were neck-and-neck with a single-B-channel connection (which has a 64-Kbps limit), but the internal TAs outperformed the externals by a wide margin on the dual-B-channel tests. On the plus side, the external products are easier to install and allow you to use the unit for voice calls even when the PC is turned off.

WHICH ONE FOR YOU?

Virtually all ISDN terminal adapters conform to industrywide standards, providing a theoretical level of compatibility between units. The theory actually spills over into practice; all of the products we tested were able to communicate with our test router over two bonded channels as well as with one another. That said, we have to caution that not all terminal adapters work flawlessly with all routers. If you're planning to buy an ISDN TA to connect to an Internet service provider, it wouldn't hurt to call your local ISP's customer service department and see if they've had any problems with a specific model of TA.

Adtran Inc.

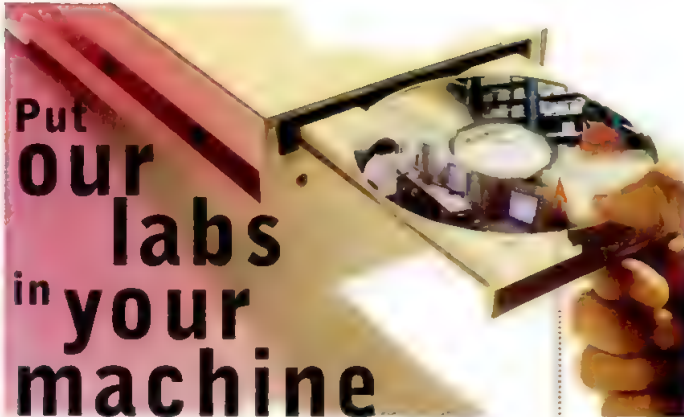
ISU Express

ALL REVIEWS BY LES FREED

Though the Adtran's ISU Express (\$595 list, \$420 street with one analog jack) is the second most expensive ISDN adapter we tested, it comes without any software. It's also a little more difficult to install than the other external units, and it performed somewhat slower on our Throughput tests using two B-channels. The ISU Express, however, provides the best diagnostic and status-monitoring fea-

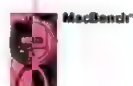


Put
our
labs
in **your**
machine



"Thanks for the service you provide in giving us a set of benchmarks that are professional, realistic, and available. This puts more objective science into our industry and prevents a lot of hype."

Professor Richard G. Helps
Dept. of Manufacturing
Engineering & Technology
Brigham Young University
Provo, Utah



ZD **Ziff-Davis Benchmarks:**
The Whole World Watches

Ziff-Davis Benchmark Operation, 1001 Aviation Parkway, Suite 400, Morrisville, NC 27560



Download our benchmarks from The Ziff-Davis Benchmark Operation Forum on ZiffNet (GO ZDBENCH) or from our World Wide Web home page at <http://www.ziff.com>. Or fax your request to ZDBOp, at 919-380-2879. Allow 4 to 6 weeks for regular delivery or enclose your FedEx number.

**IT'S LIKE
GETTING
THIS MUCH
BATTERY LIFE
IN YOUR
NOTEBOOK.**



DELL LATITUDE
Dependable Notebooks
With Superior Battery Life



NEW DELL® LATITUDE™ XPi P133ST
133MHz PENTIUM® PROCESSOR

- 11.3" SVGA Active Matrix Color Display
- 16MB RAM (40MB Max RAM)
- 256KB L2 Cache
- 810MB Hard Drive (1.2GB Max)
- PCI Bus Architecture
- Smart Lithium Ion Battery with Advanced Power Management
- 128-bit PCI Graphics Accelerator, 1MB Equivalent Video RAM
- 2 Type II/1 Type III PCMCIA Slots
- IrDA-1 Port
- Integrated 16-bit Audio
- Built-in Speaker, Stereo and Mic Jacks
- Extendable 1 Year Warranty*

★ Add an external Dell 4X CD-ROM drive for only \$359 more

Pictured System

\$4399

Business Lease*: \$158/Mo.
Order Code #800048

DELL LATITUDE XPi P120D
120MHz PENTIUM PROCESSOR

- 10.4" Dual Scan Color Display
- 8MB RAM (40MB Max RAM)
- 256KB L2 Cache
- 540MB Hard Drive (1.2GB Max)
- Smart Lithium Ion Battery with Advanced Power Management
- 32-bit Local-bus Video, 1MB Video RAM
- 2 Type II/1 Type III PCMCIA Slots
- 6.2 Pounds
- Optional Dell Latitude DeskDock Station Available
- Extendable 1 Year Warranty

★ Upgrade to an 810MB hard drive for only \$200 more.

\$2399

Business Lease: \$89/Mo.
Order Code #800036

NEW DELL LATITUDE XPi P133ST
133MHz PENTIUM PROCESSOR

- 11.3" SVGA Active Matrix Color Display
- 8MB RAM (40MB Max RAM)
- 256KB L2 Cache
- 540MB Hard Drive (1.2GB Max)
- PCI Bus Architecture
- Smart Lithium Ion Battery with Advanced Power Management
- 128-bit PCI Graphics Accelerator, 1MB Equivalent Video RAM
- 2 Type II/1 Type III PCMCIA Slots
- IrDA-1 Port
- Integrated 16-bit Audio
- Built-in Speaker, Stereo and Mic Jacks
- Extendable 1 Year Warranty

★ Double your RAM to 16MB for only \$299 more.

Pictured System

\$3899

Business Lease: \$140/Mo.
Order Code #800047

DELL LATITUDE XPi P75D
75MHz PENTIUM PROCESSOR

- 10.4" Dual Scan Color Display
- 8MB RAM (40MB Max RAM)
- 256KB L2 Cache
- 810MB Hard Drive (1.2GB Max)
- Smart Lithium Ion Battery with Advanced Power Management
- 32-bit Local-bus Video, 1MB Video RAM
- 2 Type II/1 Type III PCMCIA Slots
- 6.2 Pounds
- Optional Dell Latitude DeskDock Station Available
- Extendable 1 Year Warranty

★ Add a 28.8 XJACK®/Cabled modem for only \$259 more.

\$2499

Business Lease: \$92/Mo.
Order Code #800034

DELL LATITUDE XPi P120D
120MHz PENTIUM PROCESSOR

- 10.4" Dual Scan Color Display
- 16MB RAM (40MB Max RAM)
- 256KB L2 Cache
- 810MB Hard Drive (1.2GB Max)
- Smart Lithium Ion Battery with Advanced Power Management
- 32-bit Local-bus Video, 1MB Video RAM
- 2 Type II/1 Type III PCMCIA Slots
- 6.2 Pounds
- Optional Dell Latitude DeskDock™ Station Available
- Extendable 1 Year Warranty

★ Add a Dell Latitude DeskDock Station with Advanced Port Replicator for only \$229 more.

★ Add a 3Com 10BASE-T network card for only \$229 more.

\$2899

Business Lease: \$107/Mo.
Order Code #800037

DELL LATITUDE XPi P75D
75MHz PENTIUM PROCESSOR

- 10.4" Dual Scan Color Display
- 8MB RAM (40MB Max RAM)
- 256KB L2 Cache
- 540MB Hard Drive (1.2GB Max)
- Smart Lithium Ion Battery with Advanced Power Management
- 32-bit Local-bus Video, 1MB Video RAM
- 2 Type II/1 Type III PCMCIA Slots
- 6.2 Pounds
- Optional Dell Latitude DeskDock Station Available
- Extendable 1 Year Warranty

★ Triple your RAM to 24MB for only \$699 more.

\$1999

Business Lease: \$74/Mo.
Order Code #800044

Working out of the office? Get yourself a Dell® Latitude™ XPi notebook. It comes with enough battery life to let you work late into the sunset hours.

This extended battery life is due to our smart Lithium Ion battery and power management software. And with Intel's LM Pentium chip designed specifically for notebooks, you get Pentium processor performance without sacrificing battery life.

Call to order a Dell Latitude. It's the perfect notebook when you're on the road. Or off.

DELL

TO ORDER, CALL

800-626-9529

In Canada* call 800-839-0148
Mon-Fri 7am-9pm CT • Sat 10am-6pm CT
Sun 12pm-5pm CT • <http://www.dell.com/>

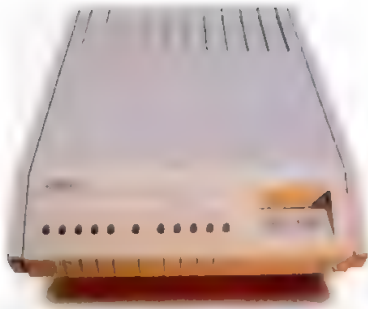
Keycode #04259

Pricing is not discountable. *The VeriTest Cross-Country v2.0 test simulates typical executive use of MS® Office applications in Microsoft® Windows® 3.11 during an airplane flight. Power management was enabled and 8MB RAM was installed. VeriTest, inc. is located in Santa Monica, CA. †For a complete copy of our Guarantees or Limited Warranties, please write Dell USA L.P., 2214 W. Braker Lane, Suite D, Austin, TX 78758. *Business leasing arranged by Leasing Group, Inc. *Prices and specifications valid in the U.S. only and subject to change without notice. Microsoft, Windows and the Windows logo are registered trademarks of Microsoft Corporation. The Intel Inside logo and Pentium are registered trademarks of Intel Corporation. XJACK is a registered trademark of US Robotics Mobile Communications Corporation. ©1996 Dell Computer Corporation. All rights reserved.



CONNECTIVITY

ISDN Adapters



Adtran ISU Express

SUITABILITY TO TASK

Internet and online connectivity	Good
Small-office use	Good

tures of the tested products. Unless you're looking for this level of monitoring, though, you could probably do better for the price.

The external ISU Express comes in several configurations. List prices are \$425 (\$325 street) for the bare-bones model with no modem or analog jack; \$595 (\$420 street) for the model we tested with an analog jack but no modem; \$705 (\$540 street) for the ISU Express with no modem and two analog jacks; and \$825 (\$650 street) for the unit with an analog jack and integrated 14.4-Kbps modem.

The first thing you notice about the ISU Express is the 11 LEDs on the front panel, a feature that you'll like if you want to see operating status at a glance. There's one LED for each of the RS-232C control signals, plus transmit- and receive-data indicators. Additional LEDs indicate power, ISDN line status, on/off hook, line ringing, and two test modes. The ISU Express also includes two front-panel switches: One puts the unit in self-test mode, and the other resets the ISU Express to its default configuration.

The ISU Express includes a Microsoft Windows 95 .INF file to make it Plug and Play-compatible. Once you install the driver, which takes a few seconds, and connect the RS-232 cable, you need to use communications software with VT-100 terminal emulation capability—such as the HyperTerminal program provided with Windows 95—to access the built-in configuration menu. You start the menu system by issuing an AT command to the ISU Express. After the menu appears on the screen, you enter your phone numbers, SPIDs, and other configuration information. Although this requires more work than Motorola's BitSurf or the 3Com Impact, it isn't quite

as difficult as it sounds; we had our test unit working in about 15 minutes. The well-designed menu system provides excellent diagnostic and status-monitoring features, and we were able to confirm the ISDN line operation from the menu screen.

We had no problems setting up the ISU Express to connect to our test router or our Internet service providers with either PPP or MP connections. The ISU Express finished last in our performance testing, but not by a significant margin.

Our test unit had one RJ-11 jack; a model with two analog jacks is available. The jack provides standard ring voltage to attached devices, allowing the ISU Express to operate with fax and answering machines. The voice quality was very good though not as loud as the other units we tested.

The ISU Express doesn't include any bundled software, so Windows 3.x users must provide their own TCP/IP stacks. We used the TCP/IP stack provided with Windows 95, but any other TCP/IP stack should work as well.

ISU Express. List price: With one analog jack, \$595. Adtran Inc., Huntsville, AL 35806; 800-827-0807; fax, 205-971-8699; <http://www.adtran.com>. *Circle 441 on reader service card.*

*ISDN*tek Inc.*

CyberSpace Internet+Plus Card

Although ISDN*tek's CyberSpace Internet+Plus Card (\$495 list) provides capable ISDN data service, it did not include Plug and Play installation and was one of the more difficult adapters to set up. It also lacks a standard RJ-11 jack, which is a drawback for home-office users looking to attach several devices to the same line.

ISDN*tek makes several ISA-bus cards in the CyberSpace series that are sold directly from the company and some resellers. We tested the CyberSpace Internet+Plus, which includes a built-in NT-1 interface. The CyberSpace Commuter+Plus Card (\$595 list) adds voice support but not an RJ-11 jack. The CyberSpace Internet Card, without a built-in NT-1 interface, is available for \$395.

The Internet+Plus Card requires a PC with an available IRQ line and 4K of free conventional memory. Once you've de-

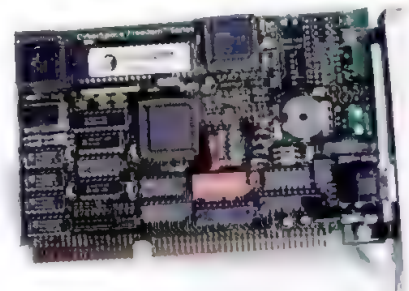
termined the IRQ and memory address settings, you must set the memory address via a DIP switch, select the IRQ with a jumper, and plug the card into your PC.

The included configuration program lets you change settings and test your configuration with a few clicks of the mouse. It also provides an on-screen graphic display of the DIP switch and IRQ jumper settings. The program can perform a hardware test on the board and place a test call on the ISDN line as well.

The Internet+Plus card comes with a copy of NetManage's Internet Chameleon. ISDN*tek plans to provide drivers for Microsoft's recently announced ISDN Accelerator Pack for Windows 95. But since the Windows 95 driver wasn't ready in time for our testing and the current driver doesn't work with the Windows 95 TCP/IP stack, we tested the Internet+Plus Card with the included NetManage TCP/IP stack. Also, the Internet+Plus Card doesn't work with standard AT command set communications programs.

We were able to connect to both our test router and Internet service providers with no problems. The Internet+Plus Card turned in a respectable performance on our performance tests, finishing with results similar to the other internal adapters.

ISDN*tek's Commuter+Plus Card, like the Mitsubishi NetViper, provides a jack for a telephone handset or headset rather than a regular RJ-11 telephone jack. This greatly limits your telephony options since you can't attach a regular telephone, modem, or fax machine to the card. And to place or answer voice calls on the ISDN line, your PC must be on and running ISDN*tek's dialer program (a limitation we also found in the NetViper). Further-



ISDN*tek CyberSpace Internet+Plus Card

SUITABILITY TO TASK

Internet and online connectivity	Good
Small-office use	Poor

By now,
over a million
geniuses have
probably told
you which
computer to buy.

To find out
if any of them are right,
give us a call.



*Rated one of the best
in customer service*

Everybody has an opinion. Follow the wrong one and it could cost you big bucks. So enough with the confusing, conflicting advice. Pick up the phone and call IBM. Tell us the kind of work you do and we'll recommend an affordable solution ideally suited to the job, and put you in touch with one of our expert IBM Business



Partners who can help you implement it. Whether you need a single desktop or you're looking to integrate your entire network, all our solutions come backed by 24-hour-a-day, 7-day-a-week telephone support. So call us today. Because it doesn't take a genius to know that if you're looking for technical solutions, there's no better place to find them than at IBM.



Call IBM for more information 1-800-426-7255, ext.4602

We're open 8am-10pm Monday-Friday, 9am-5pm Saturday (Eastern Time).



14 INCHES

AcerView 34T
(13.2" viewable image)



15 INCHES

AcerView 56E
(13.8" viewable image)



17 INCHES

AcerView 761e
(15.7" viewable image)



21 INCHES

AcerView 98i
(19.7" viewable image)

WE GO TO GREAT LENGTHS TO GIVE YOU THE MONITOR OF YOUR *choice.*

LIKE 14, 15, 17 OR 21 INCHES. (That's 13.2", 13.8", 15.7" and 19.7" viewable image respectively, to be exact). Either way, AcerView™ monitors measure up to your highest expectations. Featuring the latest technology at affordable prices, our six AcerView models come in four sizes to meet all your business needs. Whether you work with graphics programs or CAD/CAM applications, you can count on AcerView monitors for crisp graphics and text. Stable, flicker-free images. And

compatibility with video standards from

VGA to 1600 x 1280 non-interlaced

resolutions. What's more, AcerView

monitors provide revolutionary

features such as our patented

iScreen® technology for onscreen

image controls. They're manufactured

in accordance with ISO-9000, so they meet

the toughest quality standards. Best of all, they're

built by Acer®—the second largest monitor manufacturer

worldwide. For more information, please call Acer at

1-800-379-2237 AND TRY US ON FOR SIZE.



Acer, the Acer logo and iScreen are registered trademarks and AcerView is a trademark of Acer America Corporation and Acer Inc. 1996 Acer Inc. All rights reserved.

CIRCLE 034 ON READER SERVICE CARD

SUMMARY OF FEATURES

ISDN Adapters

						
	Adtran Inc. ISU Express	ISDN*tek Inc. CyberSpace Internet+Plus Card	Mitsubishi Electronics America NetViper	Motorola Information Systems Group BitSurf Pro	3Com Corp. 3Com Impact	U.S. Robotics Inc. Sportster ISDN 128K
General Features						
List price	\$595	\$495	\$349	\$495	\$795	\$549
Internal or external	External (RS232)	Internal	Internal	External (RS232)	External (RS232)	Internal
External dimensions (HWD, in inches)	1.5 x 6.5 x 8.3	N/A	N/A	1.5 x 6.5 x 8.3	1.5 x 7 x 10	N/A
Works without UART 16/550 serial port	■	N/A	N/A	■	■	N/A
Integrated V.32 analog modem	■	■	■	■	■	■
Uses switches for configuration	■	■	■	■	■	■
Complies with Windows 95 Plug and Play standard	■	■	■	■	■	■
Manufacturer and model of chip set	Motorola MC68302FC	Siemen 2085	Mitsubishi M16	Motorola MC68302FC2C	Motorola MS 482	Altera FLEX
Firmware is software upgradable	■	■	■	■	■	■
Uses Windows 95 TCP/IP stack	■	■	■	■	■	■
Dynamic bandwidth allocation	■	■	■	■	■	■
Modem command sets:						
AT/V.25bis	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Analog Support						
Supports analog phone/fax/modem	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■
Number of RJ-11 connectors	1	None	None	2	1	1
Ring-through provided	■	■	■	■	■	■ (with ring generator)
LED display shows:						
Transmitting data	■	■	■	■	■	■
Receiving data	■	■	■	■	■	■
Analog channels in use	■	■	■	■	■	■
Digital channels in use	■	■	■	■	■	■
Ring indication	■	■	■	■	■	■
Off-hook status	■	■	■	■	■	■
Compression Support						
Stac	■	■	■	■	■	■
Other compression schemes	None	None	None	None	None	Ascend, Microsoft
Switch-Standard Support						
National ISDN NI-1/Northern Telecom DMS 100	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
AT&T 5ESS	■	■	■	■	■	■
Other switch standards	NEC	None	None	None	None	National ISDN-2
B-Channel-Protocol Support						
MP/MP+	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
PPP/Synchronous PPP	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
ITU V.120	■	■	■	■	■	■
Proprietary protocol	DSU 7.6, SAP	None	None	A 1 Mux	None	TurboPPP
Software and Applications Included						
TCP/IP stack	■	■	■	■	■	■
Web browser	None	NetManage Chameleon	None	NetManage Chameleon	None	None
Other applications	None	None	None	TurboCom Hyper Access Lite	None	Sportster 128K Manager
Service and Support						
Warranty (parts and labor)	5 years	1 year	1 year	5 years	1 year	5 years
Toll-free technical-support number	800-726-8663	None	None	800-221-4380	800-876-3266	800-550-7800
Technical-support hours (eastern time)	24 hours, 7 days	11:00-8:00 M-F	12:00 noon-8:00 P.M. M-F	8:00-8:00 M-F	9:00-8:00 M-F	8:00-6:00 M-F
Online technical support	http://www.adtran.com support@adtran.com	support@isdntek.com	ihelp@corelogic.com	http://www.mot.com/MIMS/ISG	http://infodeli.3com.com info@3com.com	http://www.usr.com support@usr.com

N/A—Not applicable. The adapter is internal.

more, ISDN*tek doesn't provide a handset with the Commuter+Plus Card, so we had to swipe one from a desk phone. The audio quality was excellent, with no background hiss or static. But make sure you use a handset with volume control: On some calls the audio level was very loud.

CyberSpace Internet+Plus Card. List price: \$495. ISDN*tek Inc.; San Gregorio, CA; 415-712-3000; fax, 415-712-3003; <http://www.isdntek.com>. Circle 442 on reader service card.

Mitsubishi Electronics America

NetViper

Despite its attractive \$349 list price, Mitsubishi's NetViper internal ISDN card isn't quite ready for prime time. It performed well, but it was extremely difficult to install and configure. The adapter doesn't ship with a TCP/IP stack and doesn't work with the Windows 95 TCP/IP stack, which means you'll have to purchase NetManage's Chameleon software separately to run the card. The NetViper also lacks a standard RJ-11 jack, so you can't attach external analog devices. Finally, the NetViper is available only through Mitsubishi's distributor, QCI/CEI.

According to Mitsubishi, the NetViper uses a special-purpose ISDN controller chip to provide increased performance and to reduce the processing load on the PC's CPU. But our testing showed the NetViper's performance to be on a par with the other internal ISDN adapters we tested, not better.

We encountered several serious problems installing the NetViper. Although it claims to support Plug and Play operation with Windows 95, the NetViper insisted on setting itself for IRQ 0, address 0, and

DMA address 0, an entirely unworkable situation that caused the PC to hang up at boot time. We overrode the Plug and Play settings with the provided configuration program, but each time the system rebooted, the card reinstalled itself at the original settings and caused our PC to crash. We finally managed to restart our now-dead PC with a floppy disk, and we manually edited the CONFIG.SYS statement to assign usable addresses to the NetViper.

Once we had the addressing problem out of the way, we installed NetManage's Chameleon TCP/IP stack and the NetViper's ISDN monitor program. Like ISDN*tek's card, the NetViper does not work with the Windows 95 TCP/IP stack. With Chameleon we couldn't complete a call to our test router, and the ISDN Monitor program showed that the NetViper card couldn't communicate with the local phone company switch. We tried several different ISDN lines with no luck.

Mitsubishi provided us with an updated but unreleased driver disk, confusingly labeled Version 1.01 (the original disks supplied with the NetViper indicated that they were Version 1.1). The newer drivers worked, although the new driver did not correct the Plug and Play problem. A Mitsubishi representative insisted that there must have been a problem with our ISDN lines, but every other ISDN adapter worked fine on the same lines.

After nearly a full day of installing, removing, and configuring the NetViper, we were finally able to get it connected to our test router and to test ISP accounts. Our performance tests showed the NetViper to be a top performer, second only to U.S. Robotics' Sportster on most tests.

Like the CyberSpace Internet+Plus Card, the NetViper has a rear-panel jack for a telephone handset but not for other analog data devices. To place or receive calls, the PC must be powered up and the NetViper dialer program must be running.

Mitsubishi provides an impressive array of drivers for the NetViper, including NDIS, ODI, and Windows NT Workstation drivers—but no other software at all. The NetViper shows promise, but we can't recommend it until the Plug and Play and driver problems are solved.

NetViper. List price: \$349. Mitsubishi Elec-

tronics America, Sunnyvale, CA; 800-752-1070; <http://www.mitsubishi.com>. Circle 443 on reader service card.

Motorola Information Systems Group

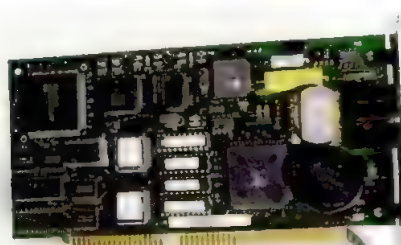
BitSurfr Pro



Motorola's BitSurfr Pro (\$495 list, \$350 street) was a standout among the products we tested. The external BitSurfr Pro was the easiest product to configure, and it provided the best performance of the external units.

Installing the BitSurfr Pro is painless, thanks to Windows 95 Plug and Play support and to Motorola's ISDN Surfr setup program. We had the BitSurfr Pro up and running within minutes of opening the box—high praise for any ISDN product. The Surfr Setup program uses a simple, wizard-like menu to guide you through the configuration process. All you need to know are the phone numbers and SPIDs for the ISDN line and the name of your local phone company.

The BitSurfr Pro is the only units we tested that provides two RJ-11 jacks, allowing you to maximize use of your ISDN line. If you ordered your ISDN line with two phone numbers, you can program the BitSurfr to route incoming calls to separate RJ-11 jacks for each number. For example, you can plug a phone into one RJ-11 jack and a fax machine into the second. An incoming ISDN data call to either line will be answered by the BitSurfr itself; a voice call on the first line will route to the phone, and an incoming call to the second line will be answered by the fax machine. The BitSurfr Pro does not provide a built-in analog



Mitsubishi NetViper

SUITABILITY TO TASK

Internet and online connectivity	Poor
Small-office use	Fair

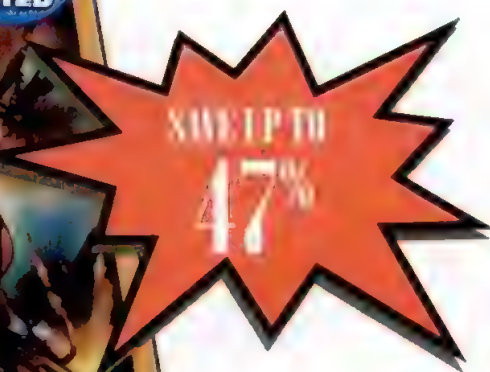


BitSurfr Pro

SUITABILITY TO TASK

Internet and online connectivity	Good
Small-office use	Excellent

.....Play to **win**
and **save** yourself
some **money**.....



Make the ultimate move for serious gamers who know the score when it comes to buying computer gaming magazines. Subscribe to Computer Gaming World now and save up to 47%!

Every monthly issue brings you exclusive first looks at the hottest, newest games... the latest in multimedia, CD-ROM and interactive environments. Plus winning strategies, master clues, in-depth reviews – all the help you need to pump up your system and play out your fantasies on this planet and beyond.

Score points and cosmic savings now with Computer Gaming World. We're worlds apart from any other computer game magazine.

- One year/12 issues – \$27.94.
YOU SAVE 41%!
- Two years/24 issues – \$49.97.
YOU SAVE 47%!

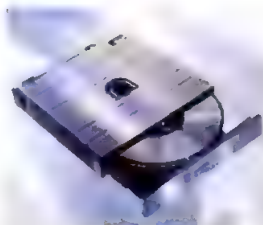
Savings based on annual cover price of \$47.40.

CALL NOW TO SAVE UP TO 47%
1-800-827-4450

To ensure savings, mention this code to the operator who answers your call: 4295.



**THERE ARE
TIMES WHEN
YOU NEED
THE MOST
ADVANCED
MULTIMEDIA
NOTEBOOK
ON THE
MARKET.**

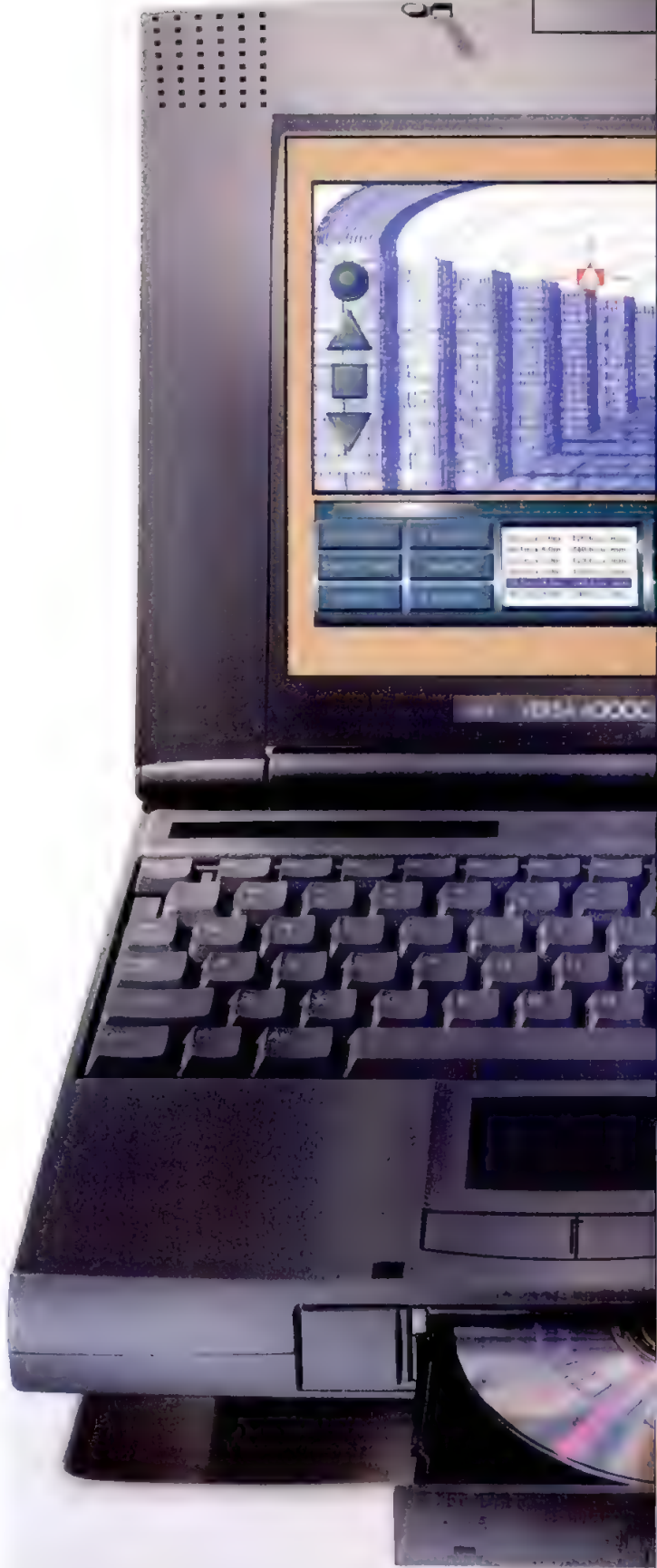


VersaBay™ II technology
lets you configure the
Versa® 4000 at a moment's
notice. Need multimedia?
Slip in the CD-ROM.

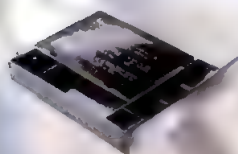


*The Versa 4000 is available in a variety of configurations with 75, 90 and 120MHz Pentium processors. For info sent via fax, call NEC FastFacts™ at 1-800-365-0476 or look us up at <http://www.nec.com>. Versa is a registered U.S. trademark. VersaBay, VersaGuide, FastFacts, and See, Hear and Feel the Difference are trademarks of NEC Technologies, Inc. The Intel Inside logo and Pentium are registered trademarks of Intel Corp. The Designed for Windows 95 logo and Windows 95 are trademarks of Microsoft Corp. User may choose one of two preinstalled operating systems: Windows 95 or Windows for Workgroups 3.11. All other trademarks are properties of their respective owners. ©1995 NEC Technologies, Inc. NEC G8A #G800K94AG85341P801.

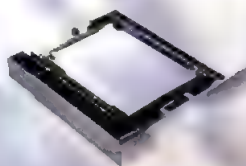
Key #27031



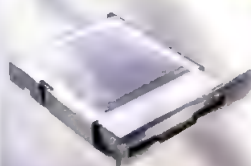
**AND TIMES WHEN
YOU DON'T.**



For more power, slide in a second state-of-the-art lithium-ion battery.



Want additional storage? Snap in a second hard drive.



For software installation, insert the 1.44MB floppy disk drive.

Introducing the NEC Versa® 4000.

Along with the innovative VersaBay II, the Versa 4000 features a 10.4" high-resolution screen, full-motion video support, SoundBlaster® Pro compatibility, two built-in speakers and a microphone. So what do you get when you combine all that with its 120MHz Pentium® processor*, 1GB hard drive, 8 - 40MB RAM, a lithium-ion battery, a VersaGlide™ pointing device and hot-swappable PC Cards? Simple. Not just the most advanced notebook for multimedia, the most advanced notebook, period. Call 1-800-NEC-VERSA.

SEE, HEAR

AND FEEL THE

DIFFERENCE.

NEC

Getting Connected

By Shawn F. Kafaipour

As the Internet and ISDN have grown in popularity, Internet service providers (ISPs) have begun to offer ISDN access through their sites. Before you buy your digital surfboard, make sure you look into the possibilities for connecting in your area.

First, you need to find out whether ISDN service is available from your local exchange carrier. This is usually simply a matter of dialing the ISDN information number of your Regional Bell Operating Company (RBOC); ISDN information numbers for most RBOCs are listed in the chart below.

Once you know whether the service is available, check the billing costs, which vary from region to region. You'll want to choose the service plan that reflects how you'll be using ISDN. Most regional phone companies offer flat-rate pricing per month per B-channel, for unlimited use or for a set number of hours. After that, they charge by the minute. And because ISDN, just like your regular phone service, costs extra for long-distance calls, you'll also want to find an ISP that has a point of presence in your calling area.

After you establish that ISDN is available in your area, find out which type of switch your local exchange carrier uses to provide ISDN service. The choices are usually AT&T 5ESS, National ISDN-1 (NI-1), and Northern Telecom DMS-100. Make sure the ISDN device you intend to purchase supports the switch type used by your local exchange carrier. Just about all of the ISDN terminal adapters currently on the market do.

Next, the phone company will need certain information in order to provision the line, which essentially means to provide the service to your house or office. This used to be a very complicated affair because there are many different combinations of ISDN services. For example, you have a choice between using one B-channel or two. And you can choose to have voice on one B-channel, data on another, or voice and data on both.

In addition there's a whole spectrum of supplementary services for you to choose from, including call forwarding and call waiting. You have to order a combination that fulfills your needs and is supported by both your hardware and your local exchange carrier.

Luckily all these combinations of services have been codified by the ISDN Solutions Group—a consortium of ISDN equipment vendors, service providers, and telephone companies—into ISDN Ordering Codes, or IOCs. Each IOC represents a specific combination of services. Today, in most cases, all you have to do is look in your ISDN terminal adapter manual to see which IOCs your device supports. Then you choose the one that fits your needs and give that IOC to your local exchange carrier.

Motorola, 3Com, and U.S. Robotics—three of the vendors of ISDN adapters in this roundup—offer their customers help in ordering ISDN service. Motorola has a service called LifeGuard that helps you get ISDN service from your local telephone company or even places the order for you. U.S. Robotics and 3Com offer similar services.

Ordering ISDN service has recently gotten even easier with the introduction of Microsoft's program, Get ISDN for Microsoft Windows. You can download software from Microsoft's Web site (http://www.microsoft.com/windows/get_isdn). The Web site contains information on services offered by the regional

Telephone Companies: Residential ISDN Connections

Company	Service	Availability	Installation charge	Maintenance and usage	Web address	Telephone number
Ameritech	ISDN Direct	IL, IN, MI, OH, WI	\$135	\$34.00 per month, plus 3 to 9 cents per minute for 1 or 2 channels	http://www.ameritech.com	800-832-6328
Bell Atlantic	ISDN Anywhere Program	DE, MD, NJ, PA, VA, WV	\$125	\$28.00 per month, plus 1 to 2 cents per minute per channel	http://www.ba.com	800-204-7332
Bell South	Single-line ISDN	AL, FL, GA, KY, LA, MS, NC, SC, TN	\$200	\$58.00 to \$70.00 per month for 1 or 2 channels	http://www.bellsouth.com	800-858-9413
GTE	Single-line ISDN	CA, FL, HI, ID, IL, IN, KY, NC, OH, OR, PA, TX, VA, WA	\$80 to \$150	\$30.00 to \$50.00 per month, plus 3 cents per minute per channel	http://www.gta.com	800-483-4926
NYNEX	Basic-rate ISDN	MA, ME, NH, NY, RI, VT	\$230	\$24.00 per month, plus 1 to 2 cents per minute per channel	http://www.nynex.com	800-438-4736
Pacific Bell*	Basic-rate ISDN	CA	\$125 (or \$34.75 with purchase of 2-year service contract)*	\$24.50 per month, plus 1 to 5 cents per minute per channel*	http://www.pacbell.com	800-472-4736
SNET	Digital Enhancer	CT	\$265	\$50.00 per month, plus 1.5 to 3.5 cents per minute per channel	http://www.snet.com	800-430-4736
Southwestern Bell*	DigiLine	AK, KS, MO, OK, TX	Info not available*	Info not available*	http://www.sbc.com	800-792-4736
Sprint	ISDN Solution Center	National	\$100 per channel	4 cents per minute per channel	http://www.sprint.com	800-289-4736
US West	Basic-rate ISDN	AZ, CO, ID, MN, MT, ND, OR, SD, UT, WA, WY	\$110	\$39.00 to \$60.00 per month, plus 2 to 7 cents per minute per channel	http://www.uswest.com	800-898-9675

*Pacific Bell and Southwestern Bell announced merger plans just before this issue went to press. Prices are therefore subject to change.

Internet Service Providers: Residential ISDN Connections

Company	Service	Availability	Installation/ startup fee	Usage rate	Web address	Telephone number
CompuServe Inc.	Compuserve Information Services	11 points of presence ¹	None	\$9.95 per month for 5 hours on 2 channels; \$2.95 per each additional hour ¹	http://www.compuserve.com	800-433-0389
CompuServe Inc.	SpryNet	11 points of presence ¹	None	\$19.95 per month for unlimited use; \$9.95 per month for 7 hours on 2 channels; \$4.95 per month for 3 hours on 2 channels; \$1.95 per each additional hour ¹	http://www.compuserve.com	800-433-0389
CompuServe Inc.	WOW!	11 points of presence ¹	None	\$17.95 per month for unlimited use ¹	http://www.compuserve.com	800-433-0389
Microsoft Corp.	The Microsoft Network	200 points of presence	None	\$4.95 per month for 3 hours; \$2.50 per each additional hour ²	http://www.microsoft.com	800-426-9400
Performance Systems International Inc.	Interramp	227 points of presence	\$9.00	\$9.00 per month for 9 hours, or \$29.00 per month for 29 hours, on 1 channel; \$1.50 per hour for a second channel	http://www.interramp.com	800-827-7482
UUNet Technologies Inc.	AlterDial	200 points of presence	None	\$30 per month for 25 hours on 2 channels; \$2.00 per each additional hour	http://www.uu.net	800-488-6383

AT&T, IBM, and NetCom are scheduled to implement residential ISDN connections later this year.

¹ Nationwide toll-free access is available for a \$6.00-per-hour surcharge. ² Single-channel access only.

Bells, helps you determine your needs in a language that you can understand, and forwards the information to your local exchange carrier in the technical language that they can understand. Get ISDN for Microsoft Windows is now also supported by several hardware vendors and Internet service providers.

At some point during installation, you'll be given one or more phone numbers for your ISDN adapter. You will also receive another set of numbers called the Service Profile Identifier (SPID). You'll need to know the SPIDs to configure your ISDN device, so keep them handy.

Finally, make sure to ask your local telephone company about its effective clear channel—the fully usable bandwidth of each B-channel. A problem can arise if the effective clear-channel bandwidth is less than what you have configured for your ISDN device. A 64-Kbps clear channel provides the optimum performance, but in some areas only a 56-Kbps clear channel is available. Even if your telephone company provides a 64-Kbps clear channel, you need to make sure that the entire route to your final destination runs at 64 Kbps; otherwise you'll need to set your device for 56-Kbps operation.

Depending on where you live, installing new ISDN lines may take anywhere from a day to a few weeks. Installation charges also vary from

region to region and the rates are adjusted every few months. So your best bet is to ask your local phone company about installation charges when you're to order.

CONNECTING TO YOUR ISP

Interoperability among ISDN devices has improved tremendously in the past year as new standards have been published and accepted by the industry. In fact, we were able to get all but one of the ISDN adapters we tested working with our ISP. Before you buy your ISDN terminal adapter, however, it's a good idea to check with your ISP to see if they have a list of ISDN devices that they have tested successfully with their central-site router. You'll probably want to choose your device from that list.

Last but not least, check different ISPs for their ISDN rates and support programs. Choosing the least expensive ISP is not always the best choice. Some ISPs offer inexpensive rates by using a pool connection instead of a dedicated connection. A pool connection may not be available at busy hours since the ISPs sell a few connections to multiple users with the hope that at any given time only a few users will be online. If you need to ensure total availability, ask for a dedicated connection, but be prepared to pay more for it—sometimes significantly more.

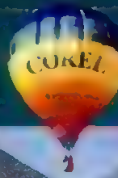
Again, to eliminate long-distance

charges, make sure to ask your ISP whether they are in the same local central office (CO) as you are. They should be able to tell from your ISDN phone numbers. Your ISP should also be able to tell you what their clear channel is. If their clear channel is 56 Kbps, you need to also set your speed to 56 Kbps.

Ask for a two-B-channel (128-Kbps) connection, but be aware that toll charges accumulate on both B-channels. Many ISDN routers drop the second B-channel if it is not being utilized during a session, keeping toll charges to a minimum. But you're not likely to find this feature in a terminal adapter.

Once you have your ISDN service and ISP account, and you have installed your ISDN adapter, it's time to make your first connection. ISDN lines do not have a dial tone, so if you're having problems, you may find it difficult to figure out whether you are connected. Make sure your adapter comes with a good set of connection management and diagnostic tools. For example, our Editors' Choice, U.S. Robotics' Sportster ISDN 128K, comes with a software utility that provides a color-coded graphical image indicating whether you are making the connection to your ISP's ISDN network.

Buying the suitable ISDN equipment and choosing the right ISP requires some planning. But once you're surfing the Internet with an ISDN connection, you'll realize that it was well worth the effort.



FROM THE MAKERS OF CorelDRAW™

THE BEST IN 32-BIT DRAFTING & DESIGN

COREL VISUAL CADD™

Corel Visual CADD™ is a highly intuitive, fast and efficient professional design and drafting program that allows both new and experienced users to exploit the full power of Windows® 95 and Windows NT™. Corel Visual CADD™ will coexist with your current environment by providing seamless integration with AutoCAD's® DWG and DXF and Generic CADD® file formats. Whether you are creating architectural drawings, technical schematics or engineering projects, Corel Visual CADD™ delivers all the tools you need to optimize your productivity at every stage of the design process. Corel Visual CADD™ provides a cost-effective CAD solution for any new or existing office.

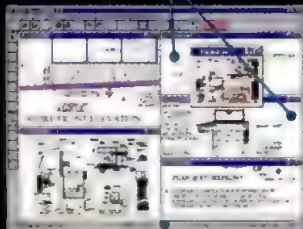
Fast, Efficient Drafting & Design

Programmable and Customizable

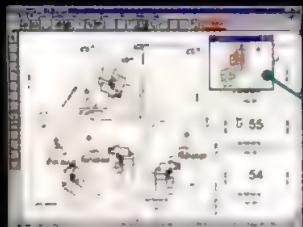
Load and Save AutoCAD® and Generic CADD® Files

Task Aware Environment™

Multiple Viewports enable you to work on several views within the same drawing file or at different magnifications in several sections of a large complex drawing. Plus, when you exit the file, the multiple viewports you've established will be saved automatically.



Multiple Dimension Types - Select from ordinate, datum, linear, angular and radial options. Plus, associative dimensions for automatic adjustment of dimension lines.



All tool palettes and menu bars are fully customizable.

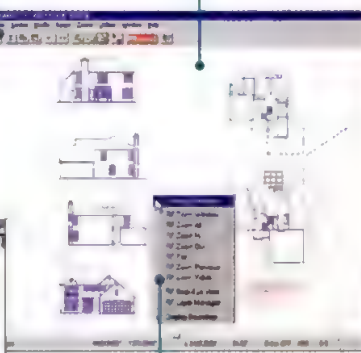
Quick Commands are logically located on the left-hand palette, so you can access the tool you need with a click of the mouse. Plus, each command has a quick 2-keystroke shortcut to speed the process even further. Spend your time drawing, not searching through tool menus.



Bird's-Eye View™ allows you to easily reference specific locations within a drawing with a thumbnail sketch.



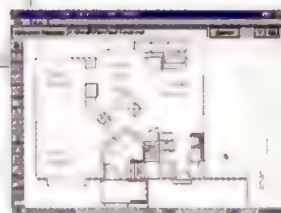
Uniquely large, unobstructed drawing areas allow you to clearly view your design.



Task Aware Environment™ is able to keep track of where you are in the design process. Since it incorporates enhanced features such as nested commands, matching tools, speed bar dialogs and a context-sensitive right mouse button, you can count on finishing your work in record time.



Dynamic Reference Frames give you absolute control over your printing layout by allowing you to reference multiple drawings and/or multiple views of the same drawing on your output sheet. You can also seamlessly integrate AutoCAD® xrefs and paper space.



CIRCLE 322 ON READER SERVICE CARD

Microsoft
Office
Compatible

Designed for
Microsoft
Windows 95

© 1998 Corel Corporation and Humera Software Corporation. All rights reserved. Corel is a registered trademark of Corel Corporation. Visual CADD, Task Aware Environment, and Bird's-Eye View are trademarks of Humera Software Corporation. All product and company names are trademarks or registered trademarks of their respective companies.

<http://www.corel.com>

Call now for faxed literature!
1-800-591-2876 ext. 3090
Document # 1161

Insight

We ship FedEx standard overnight shipping

1-800-591-2876

Call 24-hours a day

Or order via Internet
<http://www.insight.com>

\$139
US\$139.00

\$315
US\$315.00

File: AutoCAD, CorelDRAW™ and Humera Visual CADD™

*US\$ plus applicable taxes and shipping

CONNECTIVITY
ISDN Adapters

modem, but you can connect your existing analog modem to one of the RJ-11 jacks.

The BitSurfr's two RJ-11 ports make it a good choice for users who want to replace two analog phone lines with one ISDN line. The only drawback is that ISDN terminal adapters require power; if the power goes off, you can't make or answer phone calls. But don't worry. Motorola recently announced the BitBrick, a small backup battery unit designed specifically for the BitSurfr Pro. The \$79 BitBrick replaces the standard BitSurfr Pro power transformer and can power the BitSurfr Pro for up to four hours. No other product we reviewed here has a similar option.

The BitSurfr Pro provides six LEDs that indicate ISDN line status, data call in progress, receiving and transmitting data, and the status of both RJ-11 ports. The LEDs use a green-is-good, red-is-bad color scheme to provide a quick confirmation that everything is working okay.

We had no trouble connecting the BitSurfr Pro to our test router and to two different Internet service providers, using both PPP and Multilink PPP.

The BitSurfr Pro comes with NetManage's Internet Chameleon TCP/IP package, a copy of HyperAccess Lite, and Pacific CommWare's TurboComm/2 communications drivers for Windows 3.x. We tested the BitSurfr Pro with the Windows 95 TCP/IP stack. Motorola also provides a mail-in coupon for two free copies of DataBeam's FarSite document-collaboration software.

Motorola provides extended customer support hours for the BitSurfr products, and the company operates a toll-free ISDN LifeGuard service (800-894-4736) to help potential ISDN users order and configure their ISDN lines.

BitSurfr Pro. List price: \$495. Motorola Information Systems Group, Huntsville, AL; 800-426-6336, 205-430-8000; <http://www.mot.com/modems>. *Circle 444 on reader service card.*

3Com Corp.

3Com Impact

The external 3Com Impact terminal adapter (\$795 list, \$630 street) combines the speed of ISDN with a built-in 14.4-Kbps analog modem. If not for the high price—the Impact model with the

modem is \$300 more than the model without it—it would be a great all-in-one solution for users who don't already have a modem. Motorola's BitSurfr Pro, however, provides more flexibility for external analog devices.

In addition to the model we tested, 3Com offers an ISDN-only external model for \$499 (\$299 street) and an internal ISA-bus adapter with an NT-1 (\$599 list, \$499 street). Each of the adapters includes Pacific CommWare's TurboComm/2 communications drivers for Windows 3.x, and the two external models include an RS-232C cable. The Impact model with the analog modem also includes Delrina's WinFax Lite and WinComm Lite.

3Com doesn't include a TCP/IP stack with its Impact products, so you'll have to provide your own. We used the TCP/IP stack included with Windows 95. The installation disk includes an .INF file for Windows 95 Plug-and-Play compatibility. The Impact model we tested installed itself twice: once as an ISDN adapter and again as a conventional fax modem.



3Com Impact

SUITABILITY TO TASK

Internet and online connectivity	Good
Small office use	Good

The rectangular Impact, which includes one RJ-11 jack, has a large, flat top that makes an ideal parking space for a telephone. Five LEDs on the front panel show power, test in progress, and the status of the three ISDN signaling channels. Oddly, the Impact includes no LEDs that indicate data transmission.

The Impact's Windows-based configuration program is very easy to use, and it includes a self-test mode that confirms the

This isn't the only version of *this* story.

**Introducing IBM infoSage.
The online information service that
recognizes no two people think alike.**

Now you can always get another perspective on a story. Based on the personal profile you fill out, IBM infoSage probes over 2,200 sources to deliver a comprehensive version of the events. And it comes right to your desktop. Visit <http://www.infosage.ibm.com> or call us at **1 800 210-5857**. Please request order #C19 and we'll arrange for a **30-day trial**. After all, there are always more sides to a story than just one.

Solutions for a small planet™



©1996 IBM Corp.



16.7 million



Windows is a registered trademark of Microsoft Corporation in the United States and other countries.
© 1998 Canon



colors, yet it goes with everything.

Introducing the network compatible, Color Laser Beam Printer 360PS.

You want a color laser printer that stands out. But it's got to go with your network, right? Then the new Color Laser Beam Printer 360PS from Canon is the perfect match for your business.

The Canon C LBP 360PS puts all 16.7 million colors of the rainbow within your reach. It's plug 'n' play, and connects easily with Macintosh®, Windows™ and UNIX operating systems, plus Ethertalk, TCP/IP, and Novell® IPX networking environments. Innovative Fiery XJ Downloader™ and Spooler™ software give you unmatched flexibility when downloading PostScript™ files and managing network printing. Which means while you print, your computer is free to go on to the next job.



Adobe PostScript

And because Canon's the leader in laser technology, you'll see vivid, continuous tone color at blinding speeds. With the built-in Fiery™ XJE™ controller, the C LBP 360PS prints out 3 full-color pages per minute, with a resolution of 600 dpi. Plus, it feeds letter-or legal-size paper with a capacity of up to 600 sheets. In fact, the C LBP 360PS makes color printing so efficient, it can't help but make you look good.

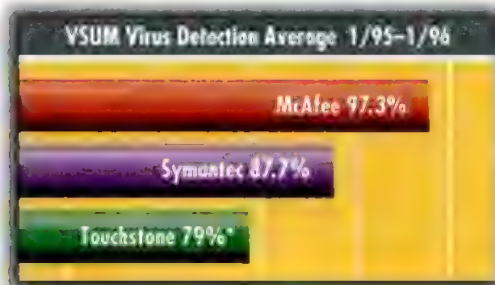
So if you're looking for a high-quality, color laser printer to go with your network, we have the system that is the solution. The C LBP 360PS from Canon. For more information, just call 1-800-OK-CANON. Or visit us on the Web at <http://www.usa.canon.com>

Canon

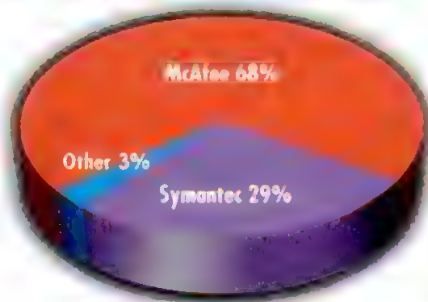
THE MOST COMPLETE PRODUCT LINE.



THE BEST VIRUS PROTECTION.



THE NUMBER ONE CHOICE WORLDWIDE.



Worldwide Standalone
DOS and Windows
Shipments - IDC, 1994

JUST SOMETHING TO THINK ABOUT BEFORE TRUSTING SYMANTEC.

"Symantec's little fib" - Information Week, 9/11/95

A lot of people disagree with Symantec's claim that they have the best virus protection. Even some Symantec people.

Vice President of Desktop Utilities, Ellen Taylor, said "we...regret any misconception..." that resulted from Symantec overstating its detection rate. *Information Week* described it as "Symantec's Little Fib."

The San Jose Mercury News added that "Symantec, with NCSA's urging, has acknowledged that it may have exaggerated a bit..."

Another Symantec ad misleads readers by comparing their desktop anti-virus product with McAfee's WebScan for the Internet.

Advertising aside, just how good is Symantec virus protection?

VSUM tests over the past year show that Symantec detected less than 88% of all viruses while McAfee VirusScan caught over 97%.



"Norton's chicken soup not as foolproof as advertised" - San Jose Mercury News, 9/15/95

Maybe that's why McAfee virus protection is trusted by over 10 million users. More than all others. And maybe that's why 80 of the Fortune 100 trust McAfee's products.

To find out for yourself, just download any fully-functioning McAfee product. There are no encryptions or time bombs. We trust you to pay us if you decide to keep it. After all, virus protection is a matter of trust.

And now that you have all the facts, we trust you'll decide on McAfee.

For more information on McAfee products, including our on-line technical support, call **1-888-VIRUS NO** toll free.



Network Security & Management

Download McAfee!

WWW: <http://www.mcafee.com> Internet FTP: <ftp.mcafee.com> BBS (408)988-4004 America Online: MCAFEE CompuServe: GO MCAFEE The Microsoft Network: MCAFEE

*Data available only for February 1996. Telephone (408)988-3832 Fax (408)970-9727 © McAfee Associates, Inc., 1996. All rights reserved. All brands and products are trademarks of their respective holders.
CIRCLE 299 ON READER SERVICE CARD

Impact's ability to place and receive calls. The configuration program also lets you download new firmware to the Impact's flash ROM, making software upgrades fast and simple.

If your ISDN line has two phone numbers, you can assign one phone number to the built-in modem and the other to the RJ-11 jack. This allows you to send and receive voice and fax calls at the same time. Voice quality on the analog port was among the best of all the units we tested.

While other combination modem/ISDN adapters we've seen require different AT-command strings to dial the modem and the ISDN adapter, the Impact automatically detects the type of device at the other end of the line and adjusts itself accordingly. In fax and modem modes, an internal speaker lets you listen to the progress of the call. We connected to a variety of ISDN, fax, and modem services without changing the Impact's configuration settings.

Connecting the 3Com Impact using Multilink PPP was a bit more complicated than with the other products we tested. If the device you are calling has separate phone numbers for each B-channel (as our test router did), you must use AT commands to enter the telephone number for the second B-channel. This is no problem if you call only one ISP or router phone number. But if you plan to call several different ISDN services, you'll need to change the setting for the second B-channel every time you place a call to a different provider.

3Com Impact. List price: \$795. 3Com Corp., Santa Clara, CA; 800-638-3266; fax, 408-764-5001; <http://www.3com.com>. Circle 445 on reader service card.

U.S. Robotics Inc.

Sportster ISDN 128K

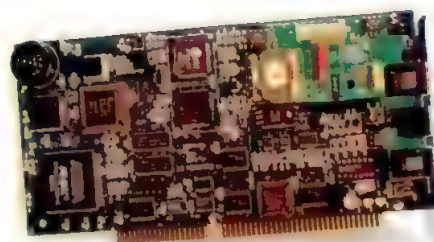


The Sportster ISDN 128K (\$549 list; \$369 street) might have been named the Screamer. It was the only product in our test group to provide data compression, and this ISA-bus ISDN adapter, from U.S. Robotics, blew the other five products away on our performance tests, particularly on single-B-

channel throughput. It was also the only internal card product we tested to provide full analog-line support, although it requires a separate product to generate a telephone ring.

Though it's an internal card (also available for EISA-bus types) and is not technically Plug and Play-compatible, the Sportster was one of the easiest products to install and configure. The Sportster is also the first product we've seen that incorporates support for Microsoft's ISDN Accelerator Pack, which provides an interface to Microsoft Windows 95's Dial-Up Networking.

Like all the other internal products we tested, the Sportster requires an I/O address and an IRQ line. To install the Sportster, you plug the board into an empty expansion slot and run the provided installation program. The installation program chooses a free IRQ and memory address. You can change the setting if necessary, but the program will warn you if you attempt to use an IRQ or I/O address that is already in use. Once you've selected the settings, the setup program



U.S. Robotics Sportster ISDN 128K

SUITABILITY TO TASK

Internet and online connectivity	Excellent
Small office use	Good

configures the board, and it installs the necessary drivers and the Sportster Manager program.

If you're running Windows 3.x, the installation program installs the WinISDN driver, which allows you to use the Sportster with such third-party TCP/IP stacks as the one from NetManage. If you're running Windows 95, the installer allows you to install the WinISDN driver, the Microsoft ISDN Accelerator Pack, or both. The Accelerator Pack allows you to use the Sportster with Windows 95's

Do you want the background on *this*?

**Introducing IBM infoSage.
The online information service that
recognizes no two people think alike.**

Based on the personal profile you fill out, IBM infoSage delivers the news and the stories behind the news — right to your desktop. Visit <http://www.infosage.ibm.com>

SIGN UP

or call us at 1 800 210-5857.

Please request order #F19 and we'll arrange for a 30-day trial. We'll give you all the details.

Solutions for a small planet™



© 1996 IBM Corp.

12.1" SVGA Active Matrix or
11.3" SVGA Dual Scan Color Display

Video/TV
Presentation Port

Programmable
Windows 95® Keys

Signature™ Adjustable
Ergonomic
Keyboard

Touch Sensitive
SensPad™
Pointing Device

Internal 4x or 6x
CD-ROM Drive

1 MB of
Video RAM

SoundBlaster 16
with Built-In Mic
and Stereo Speakers

Infrared
Data Transfer

Up to 2.1 GB
Removable
Hard Disk Drive

Two Type II or
One Type III PC Card
Expansion Slots

Up to 10-Hour
Life with optional second
Lithium Ion Battery

Available with
100, 120 or 133 MHz
Pentium® processor

The new **SENS™ 810**. The keyboard is just one of the features you'll love to get your hands on.

SENS™ 810

PENTIUM® PROCESSOR	100 MHZ	100 MHZ	120 MHZ	133 MHZ
RAM	8 MB	8 MB	16 MB	16 MB
HDD	810 MB	1.3 GB	1.3 GB	2.1 GB
DISPLAY	11.3" SVGA Dual Scan Color	12.1" SVGA Active Matrix Color	12.1" SVGA Active Matrix Color	12.1" SVGA Active Matrix Color
CD-ROM	4x CD-ROM	6x CD-ROM	6x CD-ROM	6x CD-ROM
BATTERY	Lithium Ion	Lithium Ion	Lithium Ion	Lithium Ion
MODEM	—	—	—	28.8 Kbps Fax Modem
WARRANTY	3 year	3 year	3 year	3 year
PRICE	\$2,999	\$3,799	\$4,299	\$4,999
BUSINESS LEASE	\$120 per month	\$140 per month	\$159 per month	\$184 per month

FREE Mini-Dock Docking Station with purchase of SENS™ 810 while supplies last.

SENS™ 800 (not pictured)

PENTIUM® PROCESSOR	75 MHZ	75 MHZ	90 MHZ
RAM	8 MB	8 MB	8 MB
HDD	520 MB	810 MB	1.3 GB
DISPLAY	10.4" SVGA Dual Scan Color	10.4" Active Matrix Color	10.4" Active Matrix Color
WARRANTY	3 year	3 year	3 year
PRICE	\$1,799	\$2,199	\$2,699
BUSINESS LEASE	\$72 per month	\$88 per month	\$108 per month

Full 3 Year Warranty and 1-Year Executive Support Program. 24-hour turnaround on repairs. Call for details. 30-Day Money Back Guarantee. Lifetime toll-free 24-hour technical support.

SAMSUNG

SAMSUNG ELECTRONICS DIRECT

Order today. 1-800-656-0841



Design, prices and specifications are subject to change without notice. Photos may not represent actual product. 10% restocking fee on items returned for credit. All brand and product names are trademarks or registered trademarks of their respective companies. The SENS logo is a registered trademark of Samsung Electronics America, Inc. The Intel Inside and Intel Pentium logos are registered trademarks of the Intel Corporation. This device complies with FCC Class B, UL and CSA. Call for leasing information.

CIRCLE 033 ON READER SERVICE CARD

Dial-Up Networking dialer. The Accelerator Pack driver was released after we completed our performance tests, so we tested the Sportster with NetManage's Chameleon 5.0.

We encountered no problems using the Sportster with either the Windows 95 or NetManage TCP/IP stacks. Connections were fast and reliable, and U.S. Robotics' TurboPPP Stac-compatible compression pushed the Sportster far ahead of the other products on our performance tests.

The included Sportster Manager is a utility that displays a graphic view of your ISDN setup and combines status, diagnostic, and configuration functions. It launches automatically every time you start Windows 3.x and runs basic diagnostic tests (such as checking the ISDN connection to the card). If you're running Windows 95, the Sportster Manager installs as an icon on the

*The ISA-bus Sportster
ISDN 128K adapter,
from U.S. Robotics,
blew the other five
products away on our
performance tests.*

taskbar. When you click on the icon, the main Sportster Manager window opens.

On the Sportster Manager screen, your PC is at the left, the ISDN network cloud is in the center, and any active connections are on the right. Colored lines show the path of each B-channel and the D-channel. The Sportster Manager also provides several diagnostic tests and a handy call-logging feature that keeps track of all activity on the ISDN line.

The only quibble we had with the Sportster is that its telephone jack cannot generate the standard 90-volt signal that makes your phone ring. Incoming voice calls sound a small speaker on the Sportster board; when you hear the ring, you pick up the phone and answer the call. This approach works fine for ordi-

nary telephone use, but it means that an answering machine or fax won't work because they won't be able to detect when the phone is ringing.

U.S. Robotics offers a solution to this problem with the External Ring Generator (\$95). The External Ring Generator is a matchbox-size device that connects between the Sportster board and your answering machine, phone, or fax ma-

chine. True to its name, the Ring Generator generates a proper ring signal when a call comes in. But \$95 is a steep price for something that should be part of the standard package. □

Sportster ISDN 128K. List price: \$549. U.S. Robotics Inc., Skokie, IL; 800-342-5877, 847-676-7010; fax, 847-676-7320; <http://www.usr.com>. Circle 446 on reader service card.

ZDNet™
World Wide Web Edition

<http://www.zdnet.com>

IT'S LIKE ASKING
TOM BROKAW TO SKIP
ALL THE STUFF
YOU DON'T CARE ABOUT.

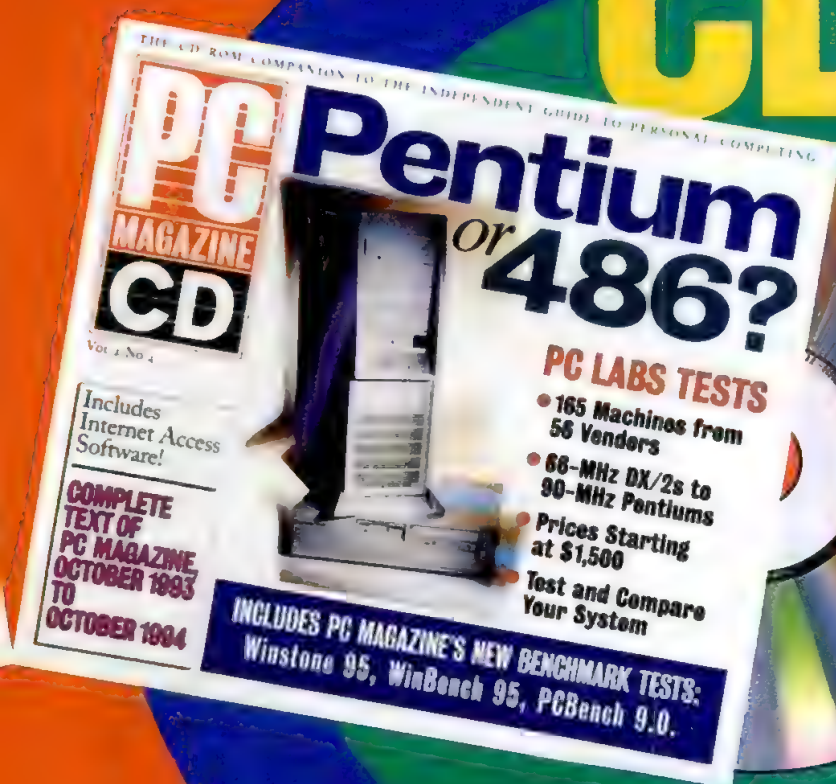
ZD Net. The ultimate computing resource online.

ZD Net, the home page of *PC Magazine* and eleven other leading Ziff-Davis computing magazines (And, BTW, the winner of GNN's "Best of the Net" award) is used by hundreds of thousands of true individuals. So we created Personal View, a part of ZD Net that's customized just for you. Just tell us the things that interest you most, and you'll get up-to-date news and information every time you log on. Coolest of all, it costs nothing. Zip. Nada. It's free. Finally, something on your personal computer that's actually—well—personal.

INTRODUCING THE CD-ROM THAT
PUTS A WHOLE NEW SPIN ON YOUR PC:

PC MAGAZINE

CD



YOU'VE
NEVER SEEN
ANYTHING
LIKE IT!

It's one thing to read about cutting-edge technology. It's another thing to plug right into it. Interact with it. Download it onto your system and play with it. That's exactly what PC MAGAZINE CD lets you do — and more.

Just one click and this interactive companion will let you:

- Walk through multimedia ScreenDemos that bring our Cover Stories to life. Hear and see the pros and cons of the entire

competitive line-up right before your eyes.

- Put your system through its paces. Download PC Bench 9.0, WinBench 95 and Winstone 95 to chart and compare every aspect of your PC's performance.
- Get working samples of real applications to run on your system. You can even take a "First Look" at products before they hit the market.
- Access the full text of every article that appeared in PC Magazine in the past 12

months — including every utility, file, tip, shortcut and patch we've published. Dynamic "Super Searching" software lets you find what you need instantly.

PC MAGAZINE CD is a powerful tool that enhances the help you get from PC Magazine. Join us as a Charter Subscriber to PC MAGAZINE CD today.

FOUR POWER-PACKED QUARTERLY RELEASES JUST \$49.95. Save 30% off the single-disc price!

CALL TO ORDER NOW! 1-800-335-1195 SUPPLIES ARE LIMITED

Toll free number is available in the United States and Canada. Other countries, call 303-664-1484 or FAX your order to 303-664-7455.

SYSTEM REQUIREMENTS: 386 or higher PC-compatible system, Windows™ 3.1, 6MB RAM, CD-ROM drive. Windows-compatible sound board recommended for some functions. PC Magazine CD is \$72 in Canada (includes Canadian GST and shipping charges), \$98 for all other foreign orders (includes air mail charges). The U. S. single copy price of PC MAGAZINE CD is \$17.95.

PC MAGAZINE CD • P.O. Box 59484 • Boulder, CO 80322-9484

Share & Share A Lot

Whether you have ten people on a network or a hundred, sharing one or more printers over your LAN can save time and money. We review 11 models that range from 12 ppm to 40 ppm; one is perfect for you.



Next to the computer itself, a standalone laser printer is probably the most expensive component in an office system, yet it is probably the least used. The typical user prints only about a dozen pages of hard copy in an 8-hour day, which means that the \$500 4-ppm personal laser on a user's desk sits idle for 7 hours and 57 minutes, more or less. It's no wonder that businesses opt to share printers among groups of users.

More and more printers can be found tethered to network connections these days. Ac-

cording to the Giga Information Group (formerly BIS Strategic Decisions), a Cambridge, Massachusetts-based market research firm, the market for network printers is robust. Sales of 13- to 25-page-per-minute (ppm) laser printers grew 60 percent last year, from 223,000 units in 1994 to 350,500 units in 1995. Unit sales for smaller networkable workgroup printers, in the 7- to 12-ppm range, held steady at about a million units for the period. The

high-speed workhorses, in the 26- to 40-ppm range, accounted for about 5,000 to 6,000

By Alfred Poor

HIGHLIGHTS

Hooking Up with a Network Printer

A few strategically placed shared network printers can save your organization a lot of money. But they can also cause headaches for the network administrator and end users if you don't choose one with the right features.

Some guidelines With a variety of print-engine speeds available, it is sometimes difficult to decide exactly what speed printer you should purchase. For small workgroups (a dozen people or fewer), a 12-ppm unit should suffice. Larger workgroups may need a 16-ppm to 20-ppm model. For more than two dozen users, consider a 24-ppm model. If you need a shared printer for an entire floor or for production-level work where you'll be producing multiple copies of many documents, consider a machine that offers 38-ppm printing or above. Also take into account the printer's rated monthly duty cycle. For large workgroups, at least a 50,000-page duty cycle is advised.

units per year; Giga expects this segment to show significant growth.

REVIEW CRITERIA

For this roundup, we tested network laser printers aimed at business users. To qualify, a printer had to have at least a 12-ppm engine, a built-in, Ethernet-compatible network interface card, plus Windows 95 and PCL support; it also had to be shipping in volume by our test cutoff date (March 5, 1996). The printers had to be new models not previously reviewed in a *PC Magazine* feature roundup, though we invited back two past Editors' Choice honorees still on the market to see how they compare with the newer competition.

We received 11 printers from six companies: the Dataproducts Typhoon 40, rated at 40 ppm; the Hewlett-Packard LaserJet 5M (a recently released 12-ppm model), HP LaserJet 4MV (a 16-ppm past Editors' Choice winner), and HP LaserJet 5Si MX (24 ppm); the Lexmark Optra R+ and LXi+ (both 16 ppm); the Okidata OL 1200/PS (12 ppm); the QMS 2425Ex Print System (24 ppm) and QMS 3825 Print

System (38 ppm); the Xerox DocuPrint 4517mp (17 ppm) and Xerox 4520mp (a 20-ppm printer that won an Editors' Choice last year).

New printers from Lexmark and Kyocera would have fit the criteria for this review but weren't available in time for testing. The Lexmark Optra N (about \$4,500) is a 24-ppm, 600-dpi, ledger-capable unit meant to compete directly with HP's LaserJet 5Si MX. It has two standard 500-sheet input bins and PCL 5 and PostScript Level 2 support; options include a universal 2,000-sheet input hopper, a duplexer, and an envelope feeder. Kyocera Electronics (800-232-6797) offers its 18-ppm, 600-dpi FS-3600+, a letter- and legal-capable printer for large workgroups.

The range of laser printers that fall under the definition of "network printer" is wide. Many 8-ppm and 10-ppm units offer direct network connectivity as an option. And any printer that doesn't can be attached to your network via an external print server (about \$400 to \$600) from companies such as Hewlett-Packard (800-

Share with your neighbor Shared printers are often placed in a central location and not on somebody's desk, meaning that they need to be able to run for long periods of time without attention. This translates to toner and other consumables that last a long time, lots of paper capacity (both input and output), and reliable performance that avoids paper jams and other malfunctions.

Sharing can be easy All it takes to add a printer to most networks is to simply plug in the network cable. Many printers come with a network interface as a standard feature, and most offer a wide range of network cards as options. A few printers even support multiple network interfaces at the same time. Also look for robust and easy-to-use remote-management software for both the administrator and end users.

752-0900), Digital Products (800-243-2333), Pacific Data Products (800-737-7112), and Lantronix (800-422-7055). We didn't test color laser printers or personal lasers since we'll cover them in separate issues this fall.

A TALE OF TWO CATEGORIES

As you can see from the page-per-minute ratings, the reviewed printers fall into two distinct categories. The five smaller printers with engine speeds of less than 20 ppm are designed to handle the printing needs of a smaller group of workers (from 5 to 25). They tend to have smaller paper-handling capabilities (500 sheets of input or less), lower duty cycle ratings (less than 50,000 pages per month), and fewer paper-handling options.

The six larger printers are aimed at departmental installations, serving the print needs of several dozen individuals. Heavy-duty print engines are designed to handle large volumes of paper on a monthly basis and to churn those pages out at rates of 20 to a frenetic 40 pages per minute. These larger printers are more likely to offer more robust paper-handling options, such as large-capacity input and output bins (2,000 sheets or more).

MOST IMPORTANT: RELIABILITY

Through our discussions with network printer buyers and vendors, we found four attributes that are key for these machines: reliability, ease of use, print quality, and performance. Reliability placed so high because, unlike a personal printer that sits within arm's reach of a user, a shared

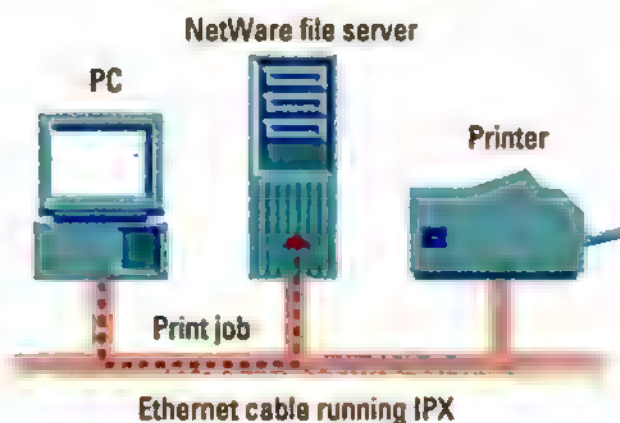
IN THIS REVIEW

Dataproducts Typhoon 40	192	Xerox 4520mp	215
HP LaserJet 5M	193	Pull vs. Push: Network Printing on	
HP LaserJet 4MV	193	NetWare and Windows NT	187
HP LaserJet 5Si MX	193	Editors' Choice	191
Lexmark Optra R+, Optra LXi+	200	Summary of Features	194
Okidata OL 1200/PS	210	Output Samples	198
QMS 2425Ex Print System	212	NDPS: New NetWare Printing Architecture	200
QMS 3825 Print System	212	HP's PCL 6: The Next Step	204
Xerox DocuPrint 4517mp	215	Performance Tests	208

Pull vs. Push: Network Printing on NetWare and Windows NT

Pull: NetWare (IPX)

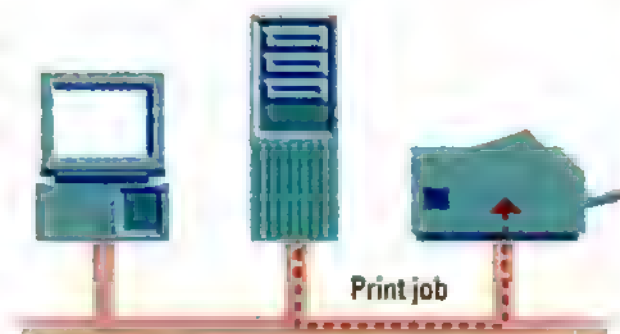
STEP 1 Your PC sends the print job through one of its virtual LPT ports. The job is redirected to a print queue located on a NetWare server.



STEP 2 The printer's print server is continually polling the queue, looking for newly arrived print jobs. Most network-printer configuration software lets the network administrator set the polling time.

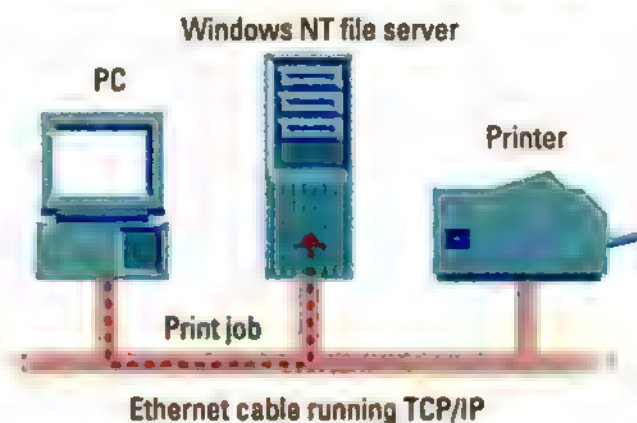


STEP 3 The printer's integrated print server pulls the print job from the queue, strips out the IPX headers, and passes the data to the printer controller to be processed and printed.

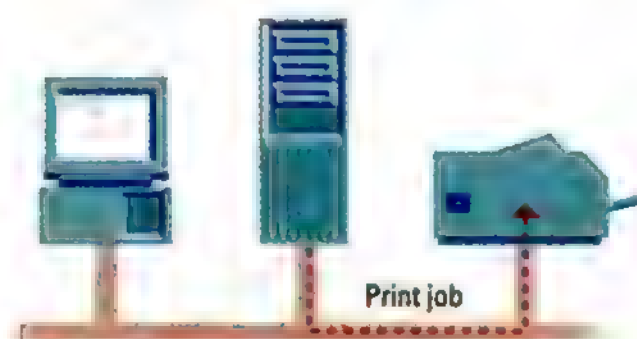


Push: Microsoft Windows NT (TCP/IP)

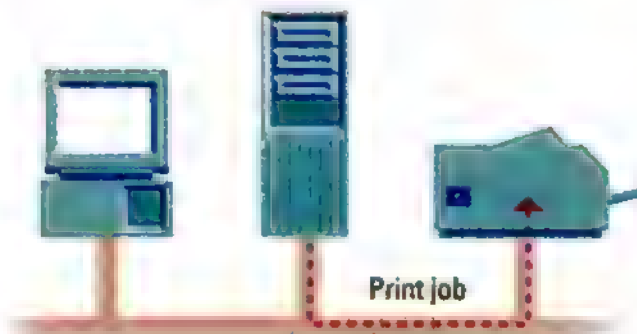
STEP 1 Your PC sends the print job through one of its virtual LPT ports to a Windows NT server.



STEP 2 Windows NT's line printer remote (LPR) spools the job into a server print queue and pushes it to the line printer daemon (LPD) server that resides in the network printer. (LPD is part of the TCP/IP protocol.)



STEP 3 When the LPD is available (that is, when the printer is not busy), a connection is established between the LPR and the LPD. The print job in the queue is sent from the LPR to the LPD and then to the printer's controller to be processed and printed.



printer is often placed in a central location, which means that it needs to be able to run for long periods without attention. This translates to toner and other consumables that last a long time, lots of paper capacity, and reliable performance that avoids paper jams and other malfunctions.

The second most important purchase decision network printer buyers report is ease of use, both for the network administrators and the end users. On both ends, network printers have evolved significantly. Today, manufacturers build network interface cards right into the printers themselves, so all it takes to add a printer to most networks is to simply plug in the network cable. The majority of the printers in this review include a NIC as standard equipment, and all offer NICs as options so you can choose the right inter-

face for your type of network. In fact, every printer in this roundup (except the Dataproducts Typhoon 40) accepts multiple network interfaces that let you connect one printer to two or more different physical networks.

On the software side, most of the printers we looked at have excellent programs that run under Windows or DOS, making it easy to configure the printer and establish the network connection. These let you create the required print queues on the network and other configuration tasks without having to use the network utilities such as NetWare's PCONSOLE. They also automatically alert the administrator

(or other designated party) via the network if an error condition (toner low, paper out, paper jammed) should crop up.

The most notable of these utilities are HP's standard-setting JetAdmin (which, when coupled with the LaserJet 5Si MX, even alerts you when paper is running low), Lexmark's MarkVision, and QMS's CrownAdmin. Xerox's Document Services for Printing (DS/P) is also robust and full-featured, though the Windows 3.1 version we had to use for testing was not as easy or intuitive as the others.

Network administrators also want a printer to be easy to use for end users. HP, Lexmark, Okidata, QMS, and Xerox all

Our Contributors: ALFRED POOR is a contributing editor of *PC Magazine*. PADRAIC BOYLE is also a contributing editor, and STEVEN C. M. CHEN and JAMES KARNEY are frequent contributors to *PC Magazine*. LAURA COX was the project leader, and JAMIE M. BSALES was the associate editor in charge of this story.

We'd like to convince you to buy
our new HP LaserJet 5 printer,
but research says we don't have to.



call 1-800-LASERJET ext. 1473, or visit our Web site at <http://www.hp.com/info/1507>.



THE NEW TI EXTENSA 510. GET 100MHz WITHOUT PAYING MEGABUCKS.



EXTENSA 510

- 100MHz Pentium® processor with PCI bus
- 8MB RAM, upgradeable to 40MB
- 810MB Removable HDD
- 10.4" Dual Scan Display
- PC Card Slot(s) (Two Type II or one Type III)
- Pre-installed choice of Windows® 95 or Windows for Workgroups®



Now you can fly through your work and keep your spending down to earth. The new TI Extensa™ 510 offers a powerful, yet practical, 100MHz Pentium processor plus full PCI bus architecture for maximized performance. Also standard are its special Windows keyboard, 810MB hard drive, light weight (under 6 pounds), and award-winning TI service and support. Like they say, it's your money. To get more machine for it, call 1-800-TI-TEXAS today. And start doing extraordinary things.



Internet: <http://www.ti.com> E-mail: 2ti@msg.ti.com

 **TEXAS
INSTRUMENTS**

*Only one operating system will be allowed on the Extensa netbooks. When you choose Windows 95 or Windows for Workgroups, the other will automatically be deleted. Extensa and "Start Doing Extraordinary Things" are trademarks of Texas Instruments. Pentium and the Intel Inside logo are registered trademarks of Intel Corp. Microsoft, Windows, and the Windows logo are registered trademarks of Microsoft Corp. © 1996 TI

CIRCLE 368 ON READER SERVICE CARD

provide drivers with intuitive Windows interfaces so that users can easily choose the print options they need (type of paper, resolution, and so on) for a particular print job. More importantly, they alert a user of the printer's status. The time to find out that the printer is jammed or out of paper is before you send off your print job, not when you rush down the hall to pick up the pages on the way to an important meeting.

THIRD CONCERN: PRINT QUALITY

Not too long ago, all laser output looked pretty much the same. Resolution was almost universally 300 dpi (dots per inch), which looked great for text documents, though graphics and halftones that were supposed to show a particular shade of gray actually showed areas of either lightly or heavily concentrated dots. Then resolution started creeping up—to 600 dpi, 800 dpi, and true 1,200 dpi (pioneered by Lexmark). Some of these resolutions were *interpolated*; that is, made to look like a higher resolution than the engine was actually creating thanks to software algorithms that would change the size, shape, or placement of the toner particles. At the higher resolutions, business charts and monochrome photos actually start to look good: You get up to 256 levels of gray, and the dots become barely visible.

In this roundup, only the workhorses intended for text-intensive, high-output applications—the Dataproducts Typhoon 40, QMS 3825, and Xerox 4520mp—have default resolutions of 300 dpi, with maximum resolutions of 400 dpi and 600 dpi, respectively. All the others print standard at 600 dpi minimum, though the Lexmark Optras and the QMS 2425Ex units we tested come with enough memory to deliver true 1,200-dpi output. There is a noticeable difference in graphics print quality as you move from 600 dpi to 1,200 dpi (see the output samples), though print speed slows notably.

Though you might think it would rank higher, performance actually falls fourth on the priority list for most corporate buyers. Since the printer is likely to be in a central location and not right next to the user, chances are a job will be out of the printer before a user can walk down the hall and pick it up. The key here is figuring out how many users will share a printer, how often they print, and how large

those jobs will be: You want to ensure enough throughput overhead so that jobs won't get stacked up like 757s at O'Hare on Thanksgiving weekend. If you need to continually churn out long text documents or multiple copies of shorter documents, for example, you may need a production-level machine like the Typhoon or QMS 3825. For single copies of shorter jobs, other aspects (such as paper handling or maximum paper size) should play

more of a role than deciding between 18-ppm and 24-ppm engine speed.

What will make more of a difference is how well a printer handles emulation switching. Much of a printer's time is taken up processing the jobs, a task made more time-consuming if the incoming jobs use varying fonts and keep switching between PCL and PostScript languages. While all the printers in this roundup could handle such toggling, the QMS

Small workgroup:

HP LaserJet 5M

Large workgroup:

HP LaserJet 5Si MX

QMS 2425Ex Print System

The four aspects of a network printer that matter most to business buyers are reliability, ease of setup and use, print quality, and performance.

All the models we tested are capable, and four stand out. If you need to share a letter- and legal-capable unit among a small- to medium-size workgroup, the best of breed is currently the new 12-ppm LaserJet 5M from Hewlett-Packard Co. It is affordable (about \$1,750 street), easy to set up and operate thanks to HP's excellent JetAdmin and JetPrint software, and produces the best 600-dpi output we saw. It also features the new PCL 6 emulation, which HP claims works with the Windows' Graphic Device Interface to boost print speed and return application control to the user more quickly.

For larger workgroups, two 24-ppm printers in this group, the HP LaserJet 5Si MX (\$4,899 list) and the QMS 2425Ex Print System (\$5,499 list) merit our Editors' Choice. Both deliver flawless 600-dpi output on paper up to ledger size (11- by 17-inch); both also have a host of paper-handling options that you can tailor to any need and class-leading administration software. The 5Si MX distinguishes itself as the easiest network printer to configure and install. The QMS excels in multi-

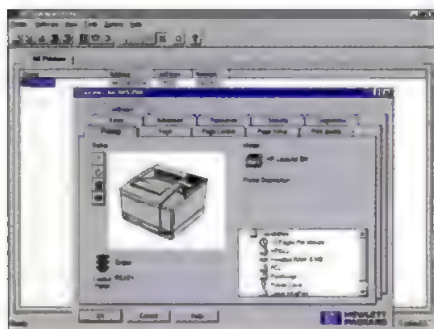
protocol, multi-emulation environments where its Crown architecture helps boost performance and cut down network traffic.

A fourth printer deserves an honorable mention. If you need ledger printing but not the speed of a 5Si MX, consider the LaserJet 4MV (\$2,916 street). This 16-ppm unit offers fewer paper-handling options than its sibling but gives you unsurpassed HP software and print quality.

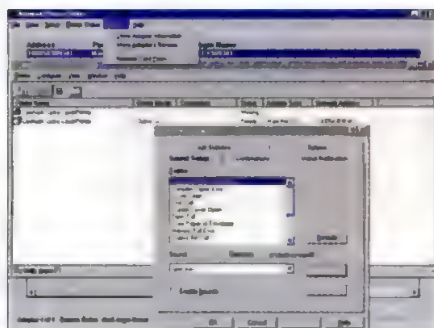
Finally, look closely at the strong points of the other players that might make them right for your needs. The innovative Xerox 4517mp, compact for a 17-ppm printer, offers an internal duplexer and a unique lockable "mailbox" sorter that lets users keep their print jobs separate and private. If you need a super-duty printer, both the 38-ppm QMS 3825 (\$22,000) and Dataproducts Typhoon 40 (\$31,000) are worth a look. The QMS is easier to administer thanks to the company's CrownAdmin software; the Typhoon, built like a tank, is set up for you and is so economical that it could pay for itself in high-throughput environments.



Network Printers



Intuitive, visual interfaces make the administrative tools from Hewlett-Packard, Lexmark, and QMS a breeze.



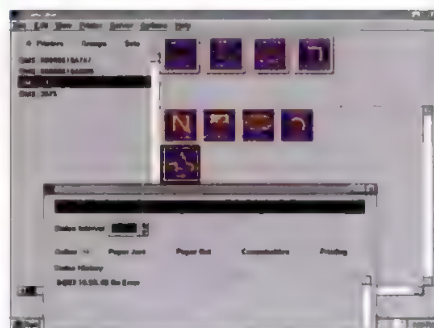
2425Ex was especially robust. QMS's Crown architecture is able to receive, compile, and process different documents or different pages of the same document while another page is being printed. Most printers process one page at a time. The Lexmark and Xerox printers, meanwhile, offer a state-saving feature that lets you keep often-used fonts and macros loaded in RAM as the printer toggles to another emulation. This saves processing time when the printer needs to switch back.

OTHER POINTS TO CONSIDER

The price you pay up front for a printer is only a fraction of what it will cost you over its lifetime. The real hidden cost is consumables. Manufacturers calculate a rating of *cost per page* for their printers, based on an industry-accepted norm of 5 percent coverage for a page (a typical page of double-spaced text). And here is where paying extra for a faster-rated printer with a higher duty cycle can pay dividends. Because its toner and developer components last longer, the economies of scale push cost per page down for the HP LaserJet 5Si MX and the QMS 2425Ex to about 1.7 cents per page, versus 2.2 cents for most others. The QMS 3825

saves even more money over time, setting you back just 1.2 cents for each printed page. The Dataproducts Typhoon 40—the most expensive printer in this group, at around \$31,000—can begin paying for itself within two years because its rated cost per page is a fraction of a penny.

Keep in mind that those cost-per-page figures don't include a huge money-eater: paper. You can cut your overall paper costs significantly just by having users print on both sides of that penny-a-sheet paper using the printer's automatic duplexer. The Typhoon 40 has a duplexer built in, and all but the HP LaserJet 4MV, Okidata OL 1200/PS, and Xerox 4520mp



offer them as options for around \$600.

Make certain that the printer you choose has sufficient flexibility to handle the kind of print jobs you intend to create. If your office needs to print pages of the same document on different kinds of paper (the first page on letterhead, the rest on plain, for example), you'll want a printer that can accommodate several paper trays. Most of the printers in this review come standard with at least two input cassettes.

Another capability worth having on your network is ledger-size (also referred to as 11-by-17, B-size, or tabloid) printing for large spreadsheets or graphics. Because of the expense of the larger print engine required, 11-by-17 printing capability pushes the price of a printer up quickly. In this roundup, the Typhoon 40, HP LaserJets 4MV and 5Si MX, QMS 2425Ex, and Xerox 4520mp are ledger-capable.

Beyond these basics, there are a range of options that make these printers more robust and convenient. Some offer sorting

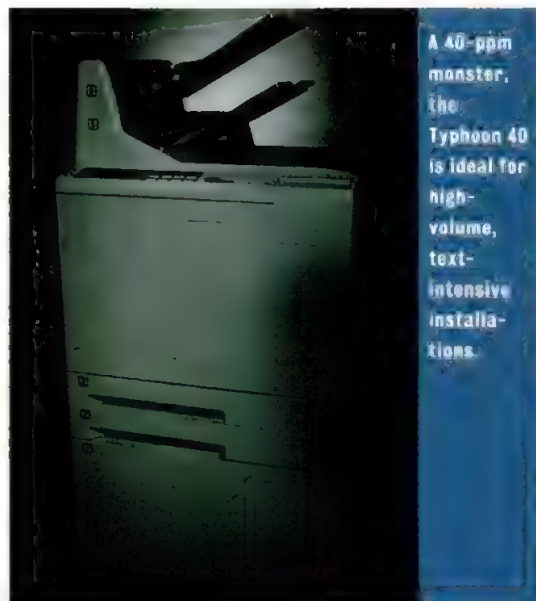
bins to keep jobs separated (the Xerox 4517mp has ten lockable "mailboxes"), hard disks to store fonts and forms and handle overflow jobs, and even automatic collators and staplers. In any case, the keys to creating a network printer that can work for you and your colleagues are reliability, flexibility, and ease of use.

Dataproducts Corp.

Typhoon 40

Production and service are the keywords that sum up Dataproducts' Typhoon 40. This 40-ppm laser printer is rated for 300,000 sheets per month, prints for just a fraction a cent per page, and has a host of features to maximize throughput. Don't worry about setting up this copier-sized beast: Its \$31,420 price includes on-site installation and initial training for end-users and your network administrator. Note that the Typhoon 40 is best suited to high-volume, text-intensive environments. Offering just 400-dpi maximum resolution and outfitted with only Level 1 PostScript, its output quality (especially graphics) trails that of other lasers we looked at.

The Typhoon's basic configuration includes 24MB RAM (expandable to 32MB), an 80MB hard disk, a 1.44MB floppy disk drive for software updates, a 2,500-page paper hopper (with the ability to handle 11-by-17 paper), and duplexing. Dataproducts is planning to add PostScript Level 2 support and move to 600-



A 40-ppm monster, the Typhoon 40 is ideal for high-volume, text-intensive installations.

dpi output in the near future. Network support includes Ethernet over 10Base5 operating IPX, EtherTalk, TCP/IP, or DEC LAT protocols.

While you can run the Typhoon with a direct connection to the server via its Centronics or serial ports, its real power lies in running virtual printers over a network. Dataproducts' PrintWatch remote management software lets the administrator configure up to 64 virtual definitions that appear as individual devices to end users. Each virtual printer can be configured to handle a certain type of job or use a set of features—printer language emulation mode, paper tray, duplex, margins and print areas, and so on. Because virtual printers are handled by the Typhoon 40's internal OS, the print server is treated as one device by NetWare.

PrintWatch is a thorough remote management tool. Once it is running on a workstation, an administrator can configure almost any feature without having to actually visit the Typhoon itself. PrintWatch has a set of screens with gas-gauge-style readouts that indicate when a printer is getting low on consumables or needs maintenance. You can track and generate a variety of information on a printer (or virtual printer's) condition and configuration. The software even tracks the number of pages (including duplex sides) printed by a user for accounting or management purposes. Our only complaint was the total reliance on PrintWatch for information; the Typhoon doesn't offer a status page that can be generated from the printer's control panel.

Several attributes set the Typhoon apart from the average departmental printer for handling heavy workloads. You can add toner and paper even while the unit is printing a job, and the unit has a self-clearing mechanism for paper jams. Since we could not even force a jam, we don't know how well it works. On most printers you have to discard the entire imaging

drum when it reaches the end of its life, but with the Typhoon you simply replace the metal film that does the work. This helps keep printing costs down to 0.7 cents per page—the lowest we saw.

The Typhoon was consistently among the fastest printers on our battery of tests, though not far out in front as one might expect from a 40-ppm engine. Our test suite, which consists primarily of one- or two-page documents sent one at a time, is partly to blame. But on a more suitable test for this class, our 100-page Text and Graphics test document, the Typhoon (at 5 minutes 17 seconds) was tied with the 24-ppm HP LaserJet 5Si MX (at 5:16).

Dataproducts is planning to add spot color capability to the Typhoon 40, which can be retrofitted to existing printers. With the upgrade, the printer will be able to place two colors on a page: black and a second primary tone, which should be good enough for corporate logos and simple business graphics.

The Typhoon 40 is a workhorse that has the durability to survive in the most demanding production environments. If throughput, low printing costs, and minimal downtime are your primary needs (over high resolution or true PostScript), this printer should be high on the buy list. —James Karney

Typhoon 40. List price: \$31,420 (including installation). Dataproducts Corp., Simi Valley, CA; 800-980-0374, 805-578-4000; fax, 805-578-4001; <http://www.dpc.com>. Circle 450 on reader service card.

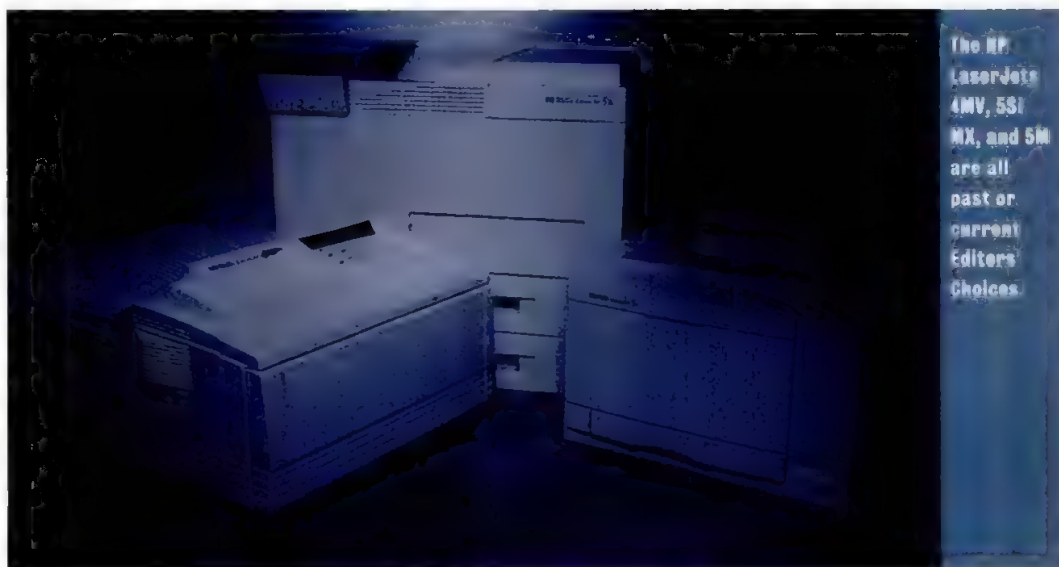
Hewlett-Packard Co.

HP LaserJet 5M, HP LaserJet 4MV, HP LaserJet 5Si MX



Hewlett-Packard, the dominant player in the laser printer arena, has three printer lines that meet the selection criteria for this review. At the high end is the 24-ppm HP LaserJet 5Si MX (\$4,899 list), which defines the standard for a large-capacity network printer. In the middle is the HP LaserJet 4MV (list \$3,549, street \$2,916), a 16-ppm printer that was introduced almost two years ago but still has a competitive position. Rounding them out is the new HP LaserJet 5M (\$2,229 list, \$1,749 street), which has a 12-ppm speed and comes with a new version of PCL.

The three printers have a number of important features in common. All three have 600-dpi resolution with HP's Resolution Enhancement Technology (RET) to smooth the jaggies on text and line art. In the HP laser-printer naming scheme, the "M" suffix indicates PostScript support, and all three printers support both PCL and Adobe PostScript Level 2. (All three printers come in PCL-only base models for about \$700 less.) All three also include an HP JetDirect network interface card that supports both Ethernet (10Base-T and 10Base2) and LocalTalk. The card is a standard HP MIO card,



SUMMARY OF FEATURES

Continues

Network Printers

PC MAGAZINE
EDITOR'S CHOICE

PC MAGAZINE
EDITOR'S CHOICE

■ YES ■ NO

Products listed in alphabetical order

	Dataproducts Typhoon 40	HP LaserJet 5M	HP LaserJet 4MV	HP LaserJet 5Si MX	Lexmark Optra R+	Lexmark Optra Lxi+	Okidata OL1200/PS
Rated engine speed	40 ppm	12 ppm	16 ppm	24 ppm	16 ppm	16 ppm	12 ppm
List price, basic configuration	\$31,420	\$2,229	\$3,549	\$4,899	\$1,749	\$3,549	\$1,839
Standard RAM/Tested-configuration RAM	24MB, 32MB	6MB, 6MB	12MB, 12MB	12MB, 12MB	2MB, 10MB	8MB, 8MB	6MB, 6MB
Memory enhancement technology	None	MEt	MEt	MEt	RAMSmart	RAMSmart	Adobe Memory Boost; Enhanced Memory Management
Base resolution/Highest noninterpolated resolution (dpi)	300, 400	600, 600	600, 600	600, 600	600, 1,200	600, 1,200	600, 600
Resolution enhancement technology	None	REt	REt	REt	PQET	PQET	OKI Smoothing
Printer-engine manufacturer	Hitachi Koki	Canon	Canon	Canon	Lexmark	Lexmark	OKI
Processor manufacturer and model	IDT 3081	Intel i80960 JF	Intel i80960 CF	AMD Am29040	AMD Am29030	AMD Am29030	MIPS R3000
Processor speed and type	33-MHz RISC	33-MHz RISC	33-MHz RISC	40-MHz RISC	25-MHz RISC	25-MHz RISC	32-MHz RISC
Highest PCL supported	PCL 5	PCL 6	PCL 5e	PCL 5e	PCL 5e	PCL 5e	PCL 5e
PostScript support	Level 1	Level 2	Level 2	Level 2	Level 2	Level 2	Level 2
PostScript author	PhoenixPage	Adobe	Adobe	Adobe	Lexmark	Lexmark	Adobe
Drivers and Software							
Windows 3.1/Windows 95/Windows NT	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Windows 95 drivers	32-bit	16-bit	32-bit	16-bit	16-bit	16-bit	16-bit
OS/2 Warp	■	■	■	■	■	■	■
NetWare 3.12/NetWare 4.x/Windows NT 3.5 utilities	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Remote printer-management software	PrintWatch	JetAdmin	JetAdmin	JetAdmin	MarkVision	MarkVision	OkView
Requires NetWare's Pserver	■	■	■	■	■	■	■
Can control different brands of printers	■	■	■	■	■	■	■
Indicates printer on-line status/paper-size loaded	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Indicates paper jam/paper out/paper low	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Indicates toner low/toner out	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Provides remote reset/printer-usage tracking	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Paper Handling							
Rated duty cycle (pages per month)	300,000	35,000	50,000	100,000	35,000	75,000	24,000
Number of standard paper cassettes/Total capacity	3/2,500	2/350	2/350	3/1,100	1/200	2/1,000	1/500
Prints on legal paper/tabloid paper/envelopes	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Options:							
High-volume paper cassette capacity (and price)	Included	500 (\$299)	500 (\$449)	2,000 (\$1,229)	None	None	500 (\$299)
Duplexer/Sorter	Included/None	\$699/None	None/None	\$669/None	\$639/None	\$639/None	None/None
Mailbox/Stapler	None/None	None/None	None/None	\$1,889/None	None/None	None/None	None/None
Rated toner cartridge life (pages at 5% coverage)	35,000	6,800	8,100	15,000	7,000	7,000	5,000
Estimated cost per page (at 5% coverage)	Less than 1 cent	2.3 cents	2.5 cents	1.7 cents	2 cents	2 cents	2.2 cents
Networking Support							
Standard/bidirectional/C-size parallel port	■ ■ ■	■ ■ ■	■ ■ ■	■ ■	■ ■	■ ■ ■	■ ■ ■
EPP/ECP	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Serial/SCSI/LocalTalk port	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Supports simultaneously active ports	■	■	■	■	■	■	■
Supports more than one installed network adapter	■	■	■	■	■	■	■
Supports NetWare 4.x NDS	■	■	■	■	■	■	■
Price of Ethernet adapter	\$995	Included	Included	Included	\$369	Included	\$479
Type of Ethernet connector	10Base5	10Base-T, 10Base2	10Base-T, 10Base2	10Base-T, 10Base2	10Base-T, 10Base2	10Base-T, 10Base2	10Base-T, 10Base2
Card supports IPX-SPX/TCP-IP	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Card supports NetBIOS/NETBEUI/EtherTalk	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Major protocols supported	DEC LAT	Sun OS, Unix	Sun OS, Unix	Sun OS, Unix	DLC, SNMP	DLC, SNMP	None
Token-Ring adapter	Info not available	\$619	\$619	\$619	\$619	\$619	\$659
Hard disk capacity (and price)	80MB (included)	N/A	42MB (\$499)	420MB (\$499)	100MB (\$799)	100MB (\$799)	N/A
Technical-support hours (eastern time)	9:00-8:00 M-F	8:00-8:00 M-F	8:00-8:00 M-F	8:00-8:00 M-F	10:00-7:00 M-F	10:00-7:00 M-F	8:00-6:00 M-F
Web address (http:// _____)	www.dpc.com	www.hp.com	www.hp.com	www.hp.com	www.lexmark.com	www.lexmark.com	www.okidata.com

1 Includes on-site installation.

N/A—Not applicable: The product does not have this feature.



Don't think of it as a powerful home computer. Think of it as an

admission ticket

to 1,388 museums, 883 galleries and 1,021 libraries.

Imagine teleporting some of the world's greatest art treasures into your very own home, www.paris.org/Musees/Louvre. Or stepping on board a satellite to observe planet Earth from 20,000 miles in space, web.nexor.co.uk/places/satellite.html.

Welcome to the educational fast lane, otherwise known as the World Wide Web. And the perfect way to explore it: the IBM Aptiva. With Pentium® processors up to 166MHz, a fast 28.8 fax/modem and Internet Access Kit.

The whole family will enjoy full-screen MPEG-1 video with concert hall Theatre-Sound. Plus, you get Windows® 95 and 32 software titles¹. Financing is available.



And you're backed by IBM's toll-free tech support 24 hours a day, 7 days a week², and a three-year limited warranty³.

Just give us a call. We'll be happy to answer any questions you have about multimedia home PCs.

So, if surfing off to the world's great institutions sounds inviting, visit us at www.pc.ibm.com/aptiva/ and learn more about Aptiva. Of course, if you're not connected, you can use a more conventional means to contact our knowledgeable IBM consultants: your phone.

For a free Aptiva Family Brochure, or to order your Aptiva directly from IBM, call 1 800 426-7235, ext 4317.



We're open 8am - 10pm, Monday - Friday, 9am - 5pm, Saturday (Eastern Time).

Solutions for a small planet™



¹Dependent external disk speed only. Application speed will be less. ²May not include all documentation and may differ from retail version. ³Excludes major holidays, during the warranty period only. Certain fees may apply. Warranty service and support for non-IBM products are provided directly to you by the non-IBM manufacturer, supplier or publisher of the product. ⁴1 year on keyboard, mouse, speakers and microphone. Other limitations apply. Copies of IBM's limited warranty are available by calling 1 800 765-4747. IBM is a registered trademark and Aptiva, TheatreSound and Solutions for a small planet are trademarks of International Business Machines Corporation. Windows is a trademark of the Microsoft Corporation. All other company names, product names, and trademarks are registered trademarks of their respective companies. ©1996 IBM Corporation.

SUMMARY OF FEATURES

Network Printers

Ends



■ YES ■ NO

Products listed in alphabetical order

	QMS 2425Ex Print System	QMS 3825 Print System	Xerox DocuPrint 4517mp	Xerox 4520mp
Rated engine speed	24 ppm	38 ppm	17 ppm	20 ppm
List price, basic configuration	\$5,499	\$21,999	\$2,070	\$4,070
Standard RAM/Tested-configuration RAM	24MB, 80MB	32MB, 32MB	6MB, 6MB	8MB, 12MB
Memory enhancement technology	None	None	Peerless MRT	None
Base resolution/Highest noninterpolated resolution (dpi)	600, 600	300, 600	600, 600	300, 600
Resolution enhancement technology	None	None	TruRes	TruRes
Printer-engine manufacturer	Canon	Ricoh	Fuji Xerox	Fuji Xerox
Processor manufacturer and model	NEC VR4300	IDT 3081E	Intel i80960	AMD Am29030
Processor speed and type	50-MHz RISC	40-MHz RISC	50-MHz RISC	25-MHz RISC
Highest PCL supported	PCL 5e	PCL 5e	PCL 5e	PCL 5e
PostScript support	Level 2	Level 2	Level 2 (\$390 option)	Level 2
PostScript author	QMS	QMS	Adobe	Adobe
Drivers and Software				
Windows 3.1/Windows 95/Windows NT	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Windows 95 drivers	32-bit	32-bit	16-bit	16-bit
OS/2 Warp	■	■	■	■
NetWare 3.12/NetWare 4.x/Windows NT 3.5 utilities	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Remote printer-management software	CrownAdmin2	Crown Admin2	DS/P 2.0	DS/P 2.0
Requires NetWare's Pserver	■	■	■	■
Can control different brands of printers	■	■	■	■
Indicates printer on-line status/paper-size loaded	■ ■	■ ■	■ ■	■ ■
Indicates paper jam/paper out/paper low	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Indicates toner low/toner out	■ ■	■ ■	■ ■	■ ■
Provides remote reset/printer-usage tracking	■ ■	■ ■	■ ■	■ ■
Paper Handling				
Rated duty cycle (pages per month)	100,000	200,000	50,000	75,000
Number of standard paper cassettes/Total capacity	2/1,000	2/500	2/350	3/750
Prints on legal paper/tabloid paper/envelopes	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Options:				
High-volume paper cassette capacity (and price)	2,000 (\$1,299)	2,500 (\$5,495 ²)	1,000 (\$300)	1,500 (\$560)
Duplexer/Sorter	\$599/None	\$5,495 ² /None	\$445/\$1,230	None/None
Mailbox/Stapler	None/\$1,499	None/None	\$1,230/None	None/None
Rated toner cartridge life (pages at 5% coverage)	15,000	30,000	10,000	14,000
Estimated cost per page (at 5% coverage)	1.7 cents	1.2 cents	2.1 cents	2.2 cents
Networking Support				
Standard/bidirectional/C-size parallel port	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
EPP/ECP	■ ■	■ ■	■ ■	■ ■
Serial/SCSI/LocalTalk port	Optional ■	Optional ■	Optional ■	Optional ■
Supports simultaneously active ports	■	■	■	■
Supports more than one installed network adapter	■	■	■	■
Supports NetWare 4.x NDS	■	■	■	■
Price of Ethernet adapter	Included	\$799	\$380	Included
Type of Ethernet connector	10Base-T	10Base-T	10Base-T, 10Base2	10Base-T
Card supports IPX-SPX/TCP-IP	■ ■	■ ■	■ ■	■ ■
Card supports NetBIOS/NETBEUI/EtherTalk	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Major protocols supported	DEC LAT	DEC LAT	DEC LAT, SNMP	DEC LAT
Token-Ring adapter	\$649	\$899	\$560	\$560
Hard disk capacity (and price)	256MB (Included)	270MB (Included)	125MB (\$485)	125MB (\$475)
Technical-support hours (eastern time)	8:00-7:00 M-F	8:00-7:00 M-F	8:00-8:00 M-F	8:00-8:00 M-F
Web address (http://_____)	www.qms.com	www.qms.com	www.xerox.com	www.xerox.com

² The high-capacity tray and duplexer are sold as a bundle.

which means that you can use a JetDirect Token-Ring card instead if needed. (The LaserJet 5Si MX has two MIO slots, so you can have two JetDirect cards installed and simultaneously active if you choose.)

The trio bundles a new version of HP's standard-setting JetAdmin network utility software. This new version, 2.0, is easy and powerful; it lets you create and manage print queues, name and configure the printer remotely, and even choose whom to notify when the unit needs attention.

End users can use the same software to monitor the printer's status. The network administrator can set up password protection to prevent users from changing the printer configuration and can even lock out changes at the printer's control panel. The LaserJet reputation for quality and ease of use is enhanced by this excellent network software; these were some of the easiest printers to configure and run.

The workhorse of the three is the 5Si MX. Rated at 24 ppm, it has the high-capacity paper handling needed to keep up with this print engine speed: a pair of 500-sheet trays that can handle letter, legal, or ledger stock, plus another 100-sheet multipurpose tray. You can also add a 2,000-sheet paper hopper (\$1,299 list), a multibin mailbox unit (\$1,889) that can collate or separate jobs, and a duplexer (\$669). This printer is designed for the long haul. It is rated for up to 100,000 pages per month and is built to be as inexpensive to operate as it is fast and reliable; the rated per-page cost is just 1.7 cents—one of the lowest of the group.

The 5Si MX was one of the fastest in this review, outperforming even printers with much faster rated engine speeds. It also did well on our Emulation Switching and Protocol Switching tests, though with one important caveat: On our test of simultaneous TCP/IP and NetWare printing, once a NetWare print job started, all queued NetWare jobs were printed before the next TCP/IP job was started. This was common to all three LaserJets. In a mixed LAN environment with heavy NetWare traffic, TCP users might wind up waiting a while for their print job to surface.

The 5Si MX has excellent print quality. Blacks are smooth and solid, and the enhanced resolution yields beautiful, smooth text. Weak points included some vertical



You
supply
the
blood
sweat
ideas
coffee
grit
midnight oil

We'll
print
the
budgets
envelopes
proposals
presentations
labels
letters

**The
Okidata
OL600e**

*6 pages per minute
of laser class output*

600 dpi class output

*Windows 95 and
DOS compatible*

*5 year LED printhead
limited warranty*

*\$399**

*1-800-OKI-TEAM x636
<http://www.okidata.com>*

OKIDATA
a Division of Oki America, Inc.

They're your ideas.
We just help.

Okidata makes a full line of Windows, DOS and Adobe® PostScript™ compatible personal business printers. We have 24 years and over 9 million printers worth of experience. Start something. Start anything. We'll finish it. For a full spec sheet, call Fax Back 1-800-654-6651. Ask for document 1014.

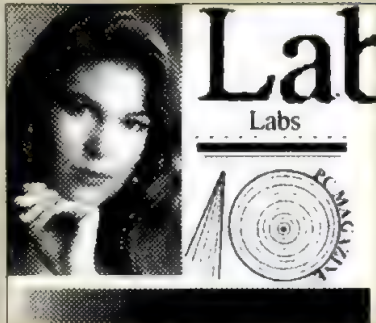
*Estimated retail price in the U.S. Actual prices may vary. System requirements: 8 MB PC RAM & 8 MB free space on hard drive; Windows 3.1, 3.11, or Windows 95. ©1995 Okidata Reg. T.M., M.D. Oki Electric Industry Co., Ltd. They're your ideas. We just help. T.M. Oki America, Inc. Adobe, PostScript T.M. Adobe Systems, Inc. Windows Reg. T.M. Microsoft Corp.

Output Samples

WE PRINTED THE SAMPLES ON these pages in both PCL (top) and PostScript modes at each printer's highest available resolution. The photo of the woman and the gradient-fill bar show how well each printer can produce halftone images. Lower-resolution output shows the dot pattern very clearly, while the better 600- and 1,200-dpi samples (with their smaller dot sizes) show smoother transitions between highlights and shadows. The concentric circles, diagonal lines, and horizontal lines of varying widths proved a challenge. Some of the lower-resolution printers couldn't reproduce the very thin lines, which appear as dotted lines rather than the solid lines we created for the original. And some of the printers failed to reproduce the thinnest horizontal line at all. Finally, the 10-point output of the word *Labs* looks good from all the printers. When the output sample is enlarged five times, however, you can see the crisper, cleaner edges produced by some of the printers. Your eye will perceive the sharper text as more readable.

DATAPRODUCTS TYPHOON 40

300 dpi, 40 ppm, 5MB RAM,
\$31,420 list price

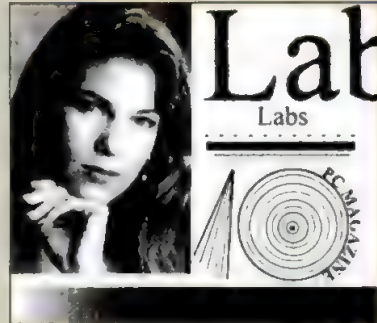


Text output is good enough for most business uses, but graphics users will be disappointed. Note the dottiness of the photo.

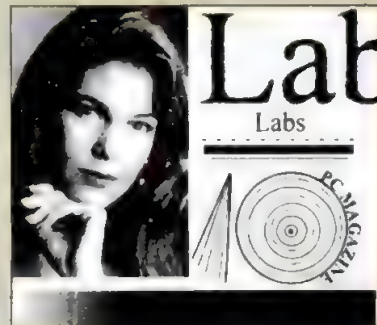


HP LASERJET 5Si MX

600 dpi, 24 ppm, 12MB RAM,
\$4,899 list price

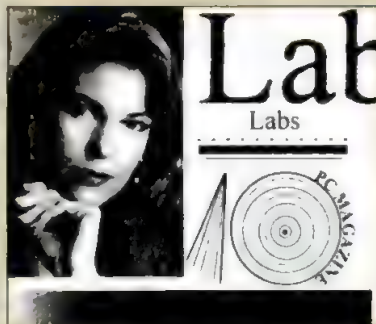


The PCL driver recovers that hairline rule here. Excellent output.

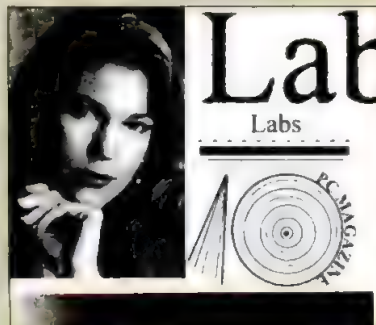


HP LASERJET 4MV

600 dpi, 16 ppm, 12MB RAM,
\$3,549 list price

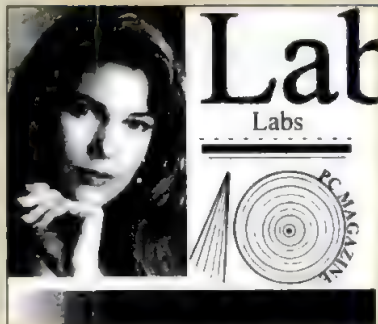


Check out the smoothness of the photo. But also note the dotted line just above the circle rather than the correct solid line.

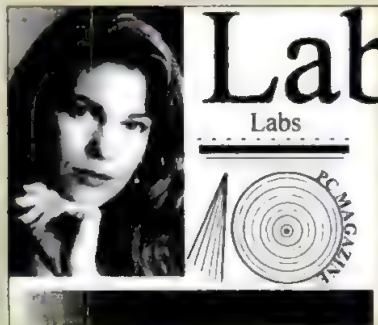


HP LASERJET 5M

600 dpi, 18 ppm, 6MB RAM,
\$2,229 list price

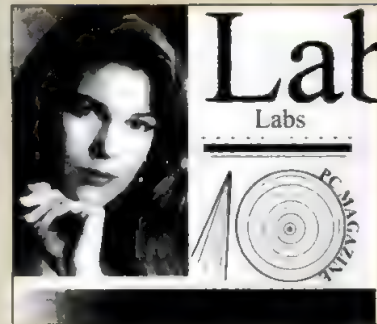


Fine output here, too. But this time, the PCL driver missed the third hairline rule altogether.



LEXMARK OPTRA R+

1,200 dpi, 16 ppm, 10MB RAM,
\$1,749 list price



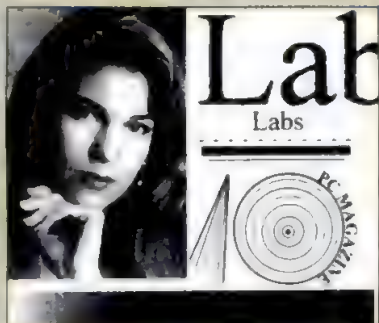
Excellent halftone reproduction and flawless text and lines—except for the missing bottom hairline rule.



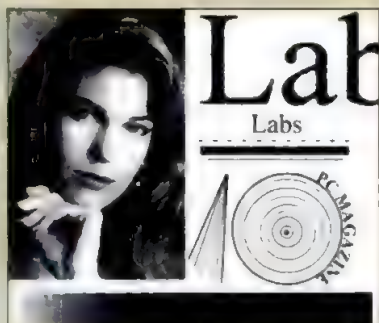
HARDWARE
Network Printers

LEXMARK OPTRA LXI+

1,200 dpi, 16 ppm, 8MB RAM,
\$3,249 list price

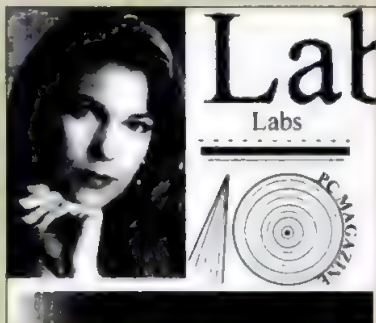


Like its sibling, this printer produced a perfect sample except for the missing line.

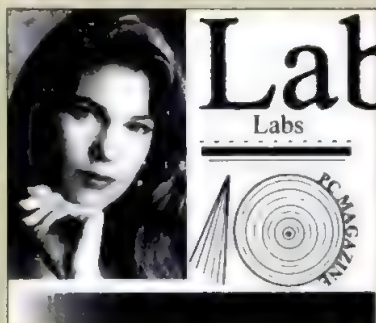


QMS 2425EX

600 dpi (1,200-dpi PostScript), 24 ppm,
24MB RAM, \$6,999 list price

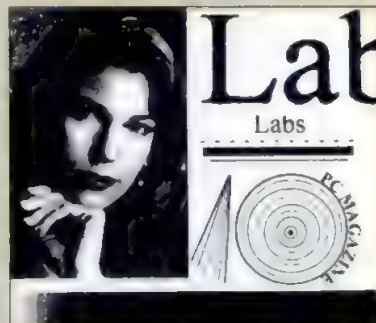


The step up to 1,200 dpi in PostScript mode makes a difference. The lines don't fall apart, and the halftone shows better subtleties.

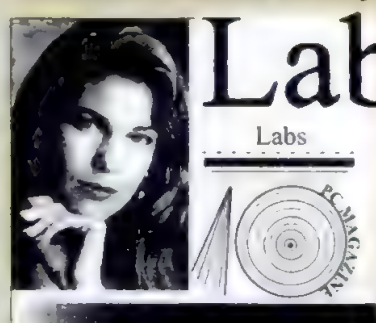


XEROX DOCUPRINT 4517MP

1,200-by-600 dpi, 17 ppm, 2MB RAM,
\$2,070 list price

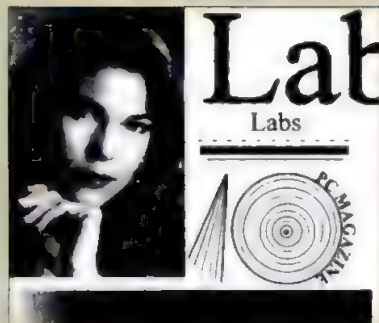


The PCL version loses the bottom hairline and the photo is a bit dark, but the overall output is good. The PostScript driver corrects the shortcomings.



OKIDATA OL1200/PS

600 dpi, 12 ppm, 2MB of RAM,
\$1,839 list price

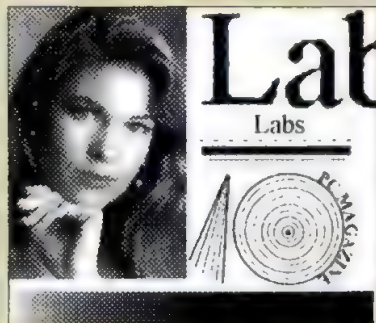


Producing fine text and line art, this is as good as any 600-dpi printer. The halftone is dark, though that could be tweaked.

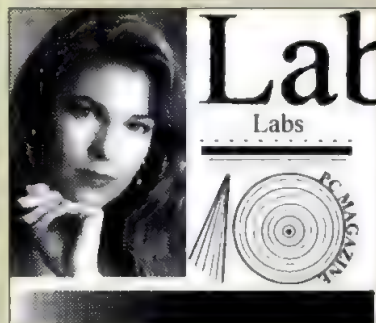


QMS 3825

300 dpi (600-dpi PostScript), 38 ppm,
32MB RAM, \$21,999 list price

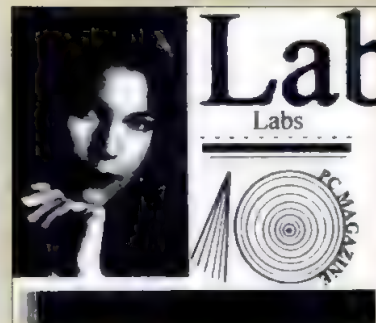


In 300-dpi workhorse mode, text is good enough, but the printer doesn't sweat the details (note the broken lines). PostScript 600-dpi output is fine.



XEROX 4520MP

600 dpi (800-dpi PostScript), 20 ppm,
4MB RAM, \$4,070 list price



PCL output is flawed, with dark photo and gradient fill, and a broken hairline rule. The higher-res PostScript output is fine.



NDPS: New NetWare Printing Architecture

When we revisit this feature next year, much of what we wrote about here should be obsolete, at least for businesses that migrate to the revision of NetWare due out this fall. Novell is working with most of the major network printer vendors to finish up NetWare Distributed Print Services (NDPS), a new architecture that will make setting up and using network printers and other shared devices a lot easier for administrators and end users.

Under NDPS, setup would be as simple as plugging the printer into the network and turning the power on. The device will be seen automatically by the network and be instantly usable to all network users. The administrator would not have to set up print queues to be accessed by users; also, drivers and subsequent driver updates would be automatically downloaded on the fly as needed. NDPS will also allow administrators to control all printers on the network from a single utility. At present, administrators with mixed-brand hardware have to launch each vendor's own admin utility to configure and control those printers. For their part, printer vendors will supply snap-in software modules for the NDPS utility that addresses the feature sets of particular printers.

For legacy printers without bidirectional communication capabilities, NDPS will have a database (borrowed from WordPerfect) of the functionality of 1,300 older printers, so the utility will be able to give users access to the appropriate features. HP, Xerox, and others should have NDPS gateways and modules on the heels of that. Eventually, Novell sees NDPS being embedded into printer controllers, which would allow users to print to any printer connected to any workstation connected to the Internet—a boon to service bureaus and branch-office operations that shuttle files via e-mail or removable cartridges.—JMB

banding on large gray-scale images. There was also a tendency toward posterization in continuous-tone images, especially with enhanced resolution enabled.

At 16 ppm, the 4MV (an Editors' Choice recipient for two years running) is not as fast as the 5Si MX, nor does it have large-capacity paper handling. It has a standard 250-sheet tray and a 100-sheet multipurpose tray; you can add an 500-sheet second tray (\$449). The printer can handle 11-by-17 ledger sheets and is rated for 50,000 pages per month, with consumables costing 2.5 cents per page.

In terms of speed, the 4MV held its own against printers with much faster ratings. It was among the fastest overall on some tests, especially under PostScript. Print quality was similar to that of the 5Si MX, with excellent text and the same small flaws on large gray-scale images.

The newest HP LaserJet, the 5M, is rated at just 12 ppm and cannot handle 11-by-17 paper, but it costs about \$1,300 less than the 16-ppm 4MV. It is designed to be shared by smaller groups. Like the 4MV, it has a single 250-sheet paper tray and a 100-sheet multipurpose tray, and you can add a 500-sheet second tray.

The 5M comes with PCL 6, which is designed to improve performance (see the sidebar "HP's PCL 6: The Next Step"). Despite this, the printer was generally a few ticks slower than the Okidata OL 1200/PS (the other 12-ppm printer we tested), though it was noticeably faster on the PostScript tests. Print quality, however, was superb. While the 5M's text quality was about the same as that of its siblings, its gray-scale images had much less banding and showed less posterization across continuous tones, especially with resolution enhancement disabled.

HP backs all three printers with one-year express-exchange warranties and free technical support.

All three of these printers have their advantages, and each has a place in your networked printer landscape. The adaptable, extensible 5Si MX can serve a large group of users and requires little attention. The 4MV still provides excellent speed and

print quality for the money. And for distributed environments or small groups where budgets may be tight, the new 5M (or the non-PostScript \$1,929 LaserJet 5N) makes an excellent choice.—*Alfred Poor*
HP LaserJet 5M. List price: \$2,229. **HP LaserJet 4MV.** List price: \$3,549. **HP LaserJet 5Si MX.** List price: \$4,899. Hewlett-Packard Co., Santa Clara, CA; 800-752-0900; <http://www.hp.com>. Circle 451 on reader service card.

Lexmark International Inc.

Optra R+, Optra LXi+

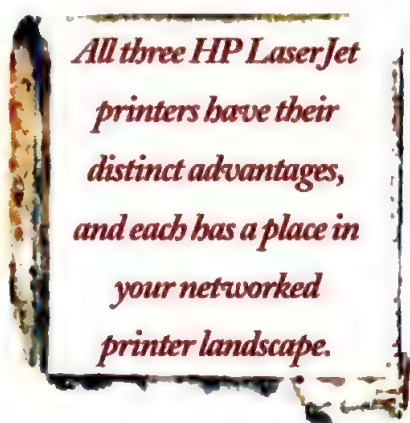
Perhaps best known for its groundbreaking 1,200-dpi resolution, the Lexmark Optra family of printers delivers ease of use and solid printing performance as well as high-quality output. For this review we looked at the Optra R+ (\$1,749 list, \$1,400 street) and Optra LXi+ (\$3,249 list, \$3,000 street). Both are 16-ppm letter- and legal-capable units built around the same Lexmark engine and internals.

The Optra R+, with a 200-page standard paper capacity, is configured for small workgroups where print quality needs are high and money is tight. The larger LXi+ delivers a 2,000-page total input capacity, an internal Ethernet card (a \$369 add-on with the R+), and 8MB of RAM standard, and is meant for larger groups. Lexmark also offers the Optra Rt+ (\$1,999), which is the same as the R+ but includes a second 200-sheet paper tray. The Optra Lx+

(\$2,399) is a step down from the LXi+, with just 4MB of RAM, one 500-sheet paper tray, and no MarkVision Ethernet card.

Powered by a 25-MHz AMD 29030 RISC processor, both the R+ and LXi+ deliver PCL 5e and PostScript Level 2 emulations and true 1,200 dpi (available with a

4MB RAM upgrade on the R+). Lexmark's own resolution enhancement technology, PQET, sharpens output even in the default 600-dpi mode. Both models can take advantage of the same internal MarkNet network card, which is available



*All three HP LaserJet
printers have their
distinct advantages,
and each has a place in
your networked
printer landscape.*

AT JUST \$1,475 YOUR NEXT PC CAN BE A COMPAQ.



Looking for a great desktop PC for your business? With its powerful Pentium® processor, lightning speed, and easy upgradability, the Compaq® ProLinea® 5100e desktop PC will impress you. At its incredible new low price, it will astound you.

Add a variety of unique serviceability features that help decrease downtime and service costs and you've got a PC that fits quite nicely into your growing business.

So now you have no reason to settle for anything less than a Compaq — and every reason to call right now.

THE COMPAQ PROLINEA 5100e — \$1,475*

- 100MHz Pentium Processor
 - 8MB RAM expandable to 136MB
 - 630MB Hard Drive
 - 3.5" 1.44MB Diskette Drive
 - Integrated PCI IDE Interface
 - PCI Local Bus Architecture
 - Plug-and-Play Compliant with Windows® 95
 - Choice of Windows 95 or Windows 3.1 Preinstalled
 - 3-Year Limited Warranty**
 - With Compaq 140 Color Monitor (12.9" viewable) Add \$255*
 - With Compaq 150 Color Monitor (13.8" viewable) Add \$375*
 - With 1GB Hard Drive Add \$130*
-

1-800-888-8358
WEEKDAYS 7-7, SAT. 9-3 CST
ASK FOR OUR NEW FREE CATALOG

COMPAQ
DirectPlus®

1-800-345-1518
FOR THE NAME OF YOUR NEAREST
COMPAQ AUTHORIZED RESELLER



*All prices shown are Compaq DirectPlus prices. Reseller prices may vary. Other models available; call for pricing. Offer available in the U.S. only. Call for lease prices. Leasing is provided for a term of 36 months and is subject to approved credit and certain terms and conditions. Call for details. **ProLinea E is covered by a Three-Year Limited Warranty. Restrictions and exclusions apply. Monitors and certain options are covered by a One-Year Limited Warranty. Call for details. ©1996 Compaq Computer Corporation. All Rights Reserved. Compaq and the Compaq Logo Registered U.S. Patent and Trademark Office. ProLinea is a registered trademark and DirectPlus is a registered service mark of Compaq Computer Corporation. Products, prices and programs are subject to change without notice. Pentium and the Intel Inside logo are registered trademarks of Intel Corporation in the U.S. and other countries. Windows is a registered trademark of Microsoft Corporation. Other products are trademarks or registered trademarks of their respective companies.

for Token-Ring, LocalTalk, and Ethernet versions. The MarkNet XL multiprotocol support can handle just about all of the popular network operating systems.

Setting up both the Optra R+ and LXi+ is straightforward. Inside you will find two available expansion connectors to accommodate up to two internal network interface cards, or you can use one of the connectors for a 100MB hard disk. A flash memory module is also available for storing macros, forms, and fonts. The all-in-one toner cartridge is available in either a 7,000- or 14,000-page capacity. Lexmark also offers a duplexer (\$639); a sorter is planned for an upcoming model, the Optra N.

The Optra models also feature a 20-character, four-line LCD. An easy-to-understand menu and simple push-button operation make them some of the easiest network printers to set up.

The fine MarkVision printer utility for Windows 3.1 can be used for configuring the print server and creating a print queue in NetWare. It also supports monitoring capabilities over the network.

On our troubleshooting tests, the utility was able to give us an accurate indication of all the problems we created, and the MarkVision operator panel window (which duplicates the printer's control panel) gave us an almost instant report of these problems. The operator panel allows full access to the control panel, so you can take the necessary action from your desktop. The only feature the MarkVision lacks is the

ability to view and manipulate print jobs in the print queue.

Lexmark has updated its printer drivers and the MarkVision network printer utility for Windows 95, though we still see room for improvement. The installation program for the printer drivers and the

utility needs to be streamlined, and the Windows 95 version of the utility is not yet end-user-accessible. So in a NetWare environment, you must have administrator access to use the utility. Both of these shortcomings will be addressed in a future release. Until then, you can rely on the Windows 3.1 version of the utility (which, incidentally, also runs faster).

Configuring the Lexmark for TCP/IP protocol and printing from Windows NT Server was painless. No printing problems occurred during our testing, and the unit passed both the emulation- and protocol-switching tests with flying colors. We were able to install the second NIC and configure it as smoothly as the first NIC in both the Optra R+ and LXi+.

Both printers produced similar results on our performance tests—not surprising, considering that both are equipped with the same engine and processor. Throughput is not quite as speedy

HP's PCL 6: The Next Step

The original Hewlett-Packard LaserJet was introduced 12 years ago, and it made PCL a familiar term for microcomputer printers. That printer used HP's PCL 3, and the company developed PCL 4 and PCL 5 for subsequent printers in response to user demands for more features. The latest model in the line, the LaserJet 5M series, introduces the newest version of the printer language: PCL 6. PCL stands for Printer Control Language; it was actually introduced in PCL 1 and PCL 2 versions in HP ink jet and dot matrix printers before the first LaserJet. Features such as downloadable fonts, form overlays, scalable fonts, and bitmap image compression are part of the PCL command set, so that it rivals PostScript in terms of flexibility and power.

The brand-new PCL 6 extends this printer language even further. New commands match Microsoft Windows' Graphics Device Interface (GDI) more closely, so print drivers can translate a document into PCL faster. This means that users will regain control of the system sooner.

The commands are object-oriented and smaller, which shrinks the size of the print data stream, which in turn puts less of a load on networks and means faster transfer times for stand-alone systems. And a new font-synthesis technology is intended to make the printed output a more accurate representation of what you see on the screen.

PCL 6 has a modular architecture that will make it easier to add extensions; for example, there are efforts under way to improve print quality of World Wide Web documents. On the other hand, it is backward-compatible with all prior versions of the printer language.

The HP LaserJets 5N and 5M are just the first LaserJets to use PCL 6; you can expect to see it as part of future HP LaserJets, as well as on printers from other vendors.—AP



It even gets people to agree.

“One of the most thoughtfully designed personal digital assistants on the market.”

Windows Sources



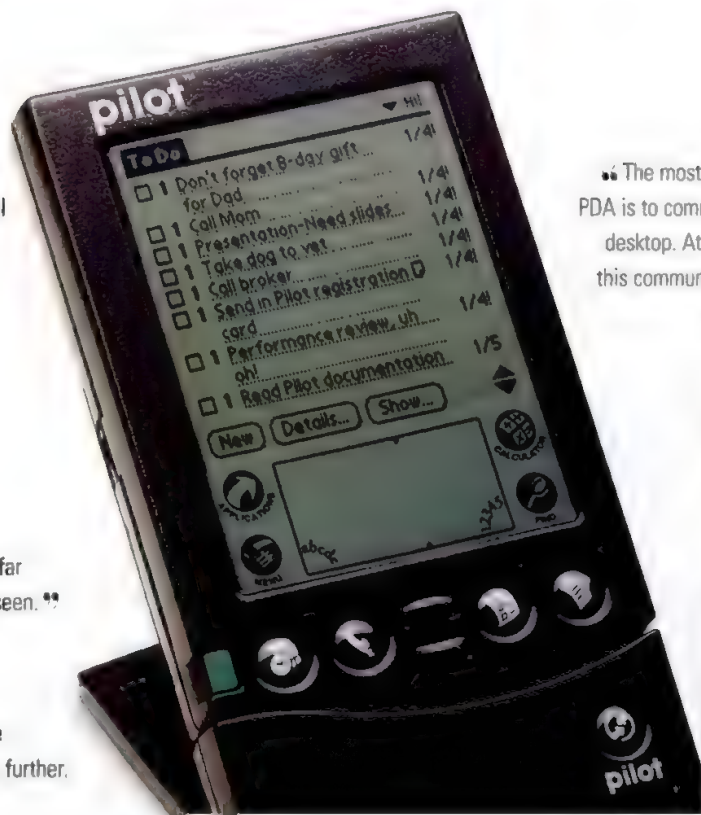
Windows Sources

“A breakthrough product...by far the best little computer I have ever seen.”

Wall Street Journal

“If you're searching for the ultimate palm-size organizer, look no further.”

★★★★★



“The most important function for a PDA is to communicate back to the user's desktop. At last a device that takes this communications link seriously.”

Mobile Office



Byte Magazine

“The first hand-held I've wanted to buy.”

San Jose Mercury News

“A little dynamo.”
Business Week

**RECENTLY, WE ASKED OUR CUSTOMERS
WHAT THEY EXPECT FROM A \$500 PRINTER.**



"Easy
envelope printing."

APPARENTLY, THEY EXPECT A \$1000 PRINTER.

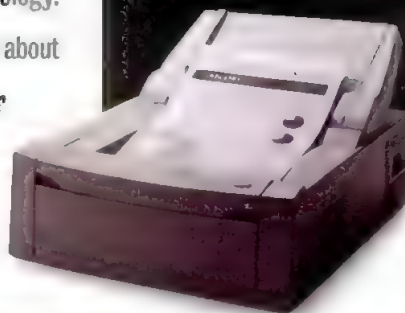
INTRODUCING THE \$500* NEC SUPERScript™ 860 LASER PRINTER.

When it comes to computer equipment, small business owners don't expect to get what they pay for. They expect to get a lot more than they pay for. And that's exactly what the NEC SuperScript 860 delivers. For about \$500, it offers outstanding 600 dpi resolution, as well as a long list of features you'd normally find on printers costing twice as much.

Say you've got a proposal due the next day. No problem. The SuperScript 860 can quickly print everything from your transparencies to a special proof sheet that lets you lay out your entire proposal. We've even included our Solutions CD which helps you make all your documents look as professional as possible. Plus, the SuperScript 860 comes with an overnight replacement warranty¹ and it's the first printer ever to offer Adobe® PrintGear™ technology.

Just call 1-800-NEC-INFO to find out more about the NEC SuperScript 860. The perfect laser printer for those whose expectations are higher than their budget.

- 8 pages per minute
- True 600 dpi with NEC Sharp Edge Technology
- Adobe Memory Booster™
- Windows® 95, Windows® 3.1x and DOS
- FREE Internet In A Box™ software
- 200-sheet paper capacity
- Proof sheet (n-up) printing
- Custom watermark capabilities
- 2-year overnight warranty
- Plus much more



**CIRCUIT
CITY**

COMPU
THE COMPUTER SUPERSTORE.

STAPLES
The Office Superstore

*Estimated street price. Some restrictions apply to the overnight replacement warranty. For more information via fax, call NEC FastFacts™ at 1-800-366-0476 and request document #778600. SuperScript, FastFacts and See, Hear and Feel the Difference are trademarks of NEC Technologies, Inc. All other trademarks and registered marks are property of their respective owners. ©1996 NEC Technologies, Inc. Key #97637

"Booklet
printing."

SEE, HEAR AND FEEL THE DIFFERENCE.™ **NEC**

Visit our new web site at <http://www.nec.com>

BENCHMARK TESTS

Network Printers



On our application tests, a vendor's implementation of the emulation language (PCL or PostScript) was just as important to performance as rated engine speed. Some printers switched between the two emulations without a hiccup; others slowed considerably.

What the Numbers Mean

The 10-page **Microsoft Word for Windows 7.0** test, which we ran using each printer's PCL emulation, shows that the 24-ppm HP LaserJet 5Si MX and the QMS 2425Ex Print System set for 600-dpi resolution are as quick as the two faster-rated units (the 38-ppm QMS 3825 Print System and 40-ppm Dataproducts Typhoon 40) set for 300 dpi. The mere size of the QMS 3825 and Typhoon 40 may account for their slower-than-expected performance on this test, since the paper has a longer path to follow through the printer and the time for the first page out is substantial. Although the 20-ppm Xerox 4520mp performed more on a par with the 16- and 17-ppm printers (except for the 17-ppm Xerox DocuPrint 4517, which came in behind them), keep in mind that the Xerox units are penalized by 10 seconds because their polling rate is fixed on the hardware.

The only surprise on our 10-page Microsoft Word for Windows text and graphics tests was the performance of the 20-ppm Xerox 4520mp, which uses a Fuji-Xerox XP-20 engine and a 25-MHz AMD 29030 processor. It printed approximately 30 seconds slower than the newer (and slower-rated) Xerox 4517mp, which uses a Fuji-Xerox ASAMA engine and a 50-MHz Intel i960 processor. The fact that the Xerox 4517mp has a newer engine that runs inter-

nally at double the clock speed can account for increased speed. The Xerox 4520mp was also outrun by the two 12-ppm printers: the HP LaserJet 5M (which uses a Canon engine and an Intel RISC 80960JF 33-MHz processor) and the Okidata OL 1200/PS (OKI engine with a MIPS R3000 RISC 32-MHz processor). The Xerox 4520mp seems to perform poorly when printing graphics, as indicated on other graphics-intensive tests, such as the **Lotus 1-2-3 for Windows** test, where it trailed the field.

The Tougher Tests The HP LaserJet 5Si MX was the overall winner on our 100-page Microsoft Word for Windows text and graphics tests in PCL mode, beating even the Dataproducts Typhoon 40 (though just by a single timer tick). The 5Si MX doesn't have to emulate PCL, which contributed to its fine showing. The Xerox 4517mp, which uses specialized PCL drivers, also did extremely well, beating not only the 20-ppm Xerox 4520mp but also the 24-ppm QMS 2425Ex. The file generated with the Xerox 4517mp driver is three times as large as the one generated by the QMS 2425Ex (which uses the HP 4Si driver), and it is probable that the overhead involved in receiving and decompressing the file is a factor in the QMS 2425Ex's performance. Since the QMS 2425Ex is equipped with a standard hard disk capable of virtual swapping, we tried turning it off for this test to ensure that the print job wasn't being swapped to disk. The QMS 2425Ex paused when printing the first 20 pages of the document (which is where the most graphics-intensive content exists), then went full-speed ahead.

The three 16-ppm printers (HP LaserJet 4MV, Lexmark Optra LXi+, and Lexmark Optra R+) all printed this 100-page document at relatively the same speed. The HP 5M, a 12-ppm printer that uses a Canon engine and Intel 80960JF 33-MHz processor, prints almost 2 minutes faster than the 12-ppm Okidata. Both machines have 6MB of memory installed. The HP 5M uses specific drivers and supports the new PCL 6, while the Okidata 1200/PS recommends an HP4 driver using PCL 5e.

On the PostScript version of this test, the two 24-ppm printers won the top scores. The QMS 2425Ex actually printed this document faster with its PostScript driver and, in fact, was the only printer whose PostScript driver outperformed its PCL counterpart

All test scores are in minutes:seconds.

Rated speed		Microsoft Word for Windows Text (PCL)	Microsoft Word for Windows Text and Graphics (PCL)	Lotus 1-2-3 for Windows (PCL)	CorelDraw for Windows (PostScript)
12 ppm	HP LaserJet 5M	1:05	1:07	0:31	0:47
12 ppm	Okidata OL 1200/PS	0:59	1:08	0:25	0:53
16 ppm	HP LaserJet 4MV	0:52	0:57	0:24	0:35
16 ppm	Lexmark Optra R+	0:58	1:00	0:26	0:45
16 ppm	Lexmark Optra Lxi+	0:55	1:01	0:27	0:44
17 ppm	Xerox 4517*	1:01	1:00	0:31	0:55
20 ppm	Xerox 4520mp*	0:56	1:30	0:39	0:57
24 ppm	HP LaserJet 5Si MX	0:39	0:46	0:22	0:40
24 ppm	QMS 2425Ex	0:40	0:49	0:23	0:30
38 ppm	QMS 3825	0:43	0:43	0:33	0:38
40 ppm	Dataproducts Typhoon 40	0:36	0:42	0:24	0:32

* Results include Xerox's default network polling time of 7 to 10 seconds, which under NetWare 3.1 could not be changed to the 2-second time we used for the other printers.

◀ BETTER

◀ BETTER

◀ BETTER

◀ BETTER

on this test. QMS uses its own version of PostScript, and the company may have optimized certain interpreter functions to be more efficient in their architecture (making them work better with both the Crown operating system and the processor). The Dataproducts Typhoon 40, which prints slower than the three 16-ppm printers, uses a PostScript Level 1 interpreter that isn't capable of handling compressed image data.

On our **Multiple Print Jobs** test, the Typhoon 40 was the overall winner, but only by a small margin. The four fastest-rated printers (Typhoon 40, HP 5Si MX, QMS 3825, and QMS 2425Ex) all completed the test in less than 40 seconds. The Xerox 4520mp did well on this test since the files were small and contained no graphics. All machines handled the multiple print job fairly well, with no delays between jobs.

For the **Emulation Switching** test, we interleaved our 10-page text and graphics Word document and our 1-page Corel PostScript document. Each document was printed three times (for a total of six documents). This is where the two QMS printers really shone. The QMS 2425Ex completed the test in almost half the time as the competing HP 5Si MX. We attribute this difference at least partly to the ability of the QMS Crown architecture to receive, compile, and process different documents or different pages of the same document while another page is being printed. Most printers process one page at a time.

The two Lexmark printers also performed well. The Lexmark Optra family of printers uses a single set of object-oriented functions (jointly developed by Lexmark and IBM) that support graphics functions for PostScript Level 2 and PCL 5e. Lexmark's graphics software calls on page-map code, which has knowledge of the internal format of bitmaps and allows both PCL and PostScript emulators to use a unified graphics package. One of the benefits of this design is a *state-saving option*, which keeps the emulator from restarting when the printer is switched to another emulation. With state saving on, the resources from each emulation are maintained, and there are no delays between different print job emulations.

The manner in which a printer determines a PCL job from a PostScript job usually involves an algorithm that scans a small portion of the data stream for identifiable PCL and PostScript

codes. You then set the printer up to auto-sense print jobs as opposed to specifying a specific emulation. In the Windows environment, printers such as these HP LaserJets and the two Xerox units have drivers and interpreters that support the creation of PJJ commands for switching emulations.

PJJ, a language invented by Hewlett-Packard, handles functions outside the realm of PCL such as printer status functions. A Windows driver that issues a PJJ emulation switch command provides a bulletproof way of switching emulations. Vendors such as QMS will support PJJ in the future. The Dataproducts printer requires setting up separate virtual printers with separate queues for each emulation to ensure proper switching.

Delays between jobs were noticeable in the two Xerox printers. Although both Xerox printers have a state-saving feature like the Lexmarks', the tested configurations lacked the RAM (about 20MB) required to enable it. The recommended amount of memory for state saving in both PCL and PostScript mode is 20MB for the Xerox 4520mp (tested with 12MB RAM) and 22MB for the Xerox 4517mp (tested with 6MB RAM).

We also ran each printer through a **Protocol Switching** test to determine if it could handle interleaved print jobs coming from two different types of networks. Switching protocols required that each print server be issued a TCP/IP address that matched our isolated test setup. Some printer utility software, such as HP's JetAdmin, allowed us to easily set the print server's TCP/IP address through software. Others, like Xerox, required an "arp" command to be issued from the Windows NT server. We used Windows NT TCP/IP print services using LPR/LPD (Line Printer Remote/Line Printer Daemon). If a vendor didn't supply us with a specific NT driver, we used the driver in Windows NT that most closely matched the printer.

All printers were successful at switching between the IPX and TCP/IP protocols. On our tests, we found that the Typhoon 40 favored the IP protocol but still allowed IPX jobs to print between IP jobs. Although the Okidata OL 1200/PS was able to switch protocols with Rev H of their print server card (Rev B didn't have that capability), we were confronted with port time-out settings, which caused delays in TCP/IP printing.

The Lexmark, QMS, and Xerox printers all successfully interleaved IPX jobs with IP jobs. The HP LaserJet printers, using HP's JetDirect cards, were not successful in interleaving IPX jobs with IP jobs. HP confirms that the JetDirect cards service the NetWare queue until all jobs are printed (a delay mechanism built into the JetDirect card is not settleable). Since HP sells largely to the NetWare community, it consciously made the decision to service the entire NetWare queue. HP also claims that most printing scenarios will not present multiple IP and IPX jobs to the printer concurrently.

During our testing, while the HP JetDirect print servers were servicing our IPX jobs, the NT server was attempting to print jobs every 2 seconds, only to find the printer busy. We tried using the LPR/LPD TCP/IP printing protocol as well as DLC, the latter suggested by HP documentation. We

Multiple Print Jobs (PCL)	100-Page Text and Graphics (PCL)	100-Page Text and Graphics (PostScript)	Emulation- Switching (PCL and PostScript)
1:02	9:00	12:16	4:30
0:55	11:00	14:25	5:36
0:49	7:41	8:45	3:41
0:51	7:43	8:08	2:20
0:51	7:32	7:49	2:23
0:55	6:53	10:20	4:38
0:48	10:36	10:17	5:38
0:37	5:16	6:32	3:15
0:39	7:49	5:52	1:43
0:38	6:02	9:48	1:45
0:33	5:17	10:02	3:08
◀BETTER	◀BETTER	◀BETTER	◀BETTER

BENCHMARK TESTS

also tried numerous polling times on the JetDirect cards. All HPs serviced the IPX jobs in a batch and let the IP jobs through when the queue was completely empty.

How We Tested

All speed tests were conducted on a NetWare 3.12 network. A specific queue was set up for each printer, and the print server was set to poll the NetWare queue every 2 seconds (except for the Xerox units, which had a default setting of 10 seconds).

We spooled each print job RAW to the printer as opposed to using Windows 95 EMF spooling, which allows for quicker return to application time in some non-PostScript printers. PC Magazine Labs did perform tests to determine the difference between RAW and EMF and found that it makes little difference when printing small jobs. We felt that RAW print streams would allow for a fairer comparison among the different printers—especially since vendors such as HP did not provide EMF support. Except for setting the drivers with the proper memory setting, we tested each printer with its default settings.

The **Microsoft Word for Windows 7.0** short test measures a printer's speed in producing a 10-page report that incorporates multiple fonts and type faces, as well as five small bitmapped graphics images.

The **Microsoft Word for Windows 7.0** long test measures a printer's speed in producing a 100-page report that uses multiple fonts, typefaces, line art, and gray-scale images. This test was run with both PCL and PostScript drivers.

The **Lotus 1-2-3 for Windows** test measures a printer's speed in producing a 3-page spreadsheet that contains pie, bar, and radar

charts.

The **CorelDraw 6** test measures a printer's speed in producing a 1-page document that contains a gray-scale texture map that encompasses the entire page, as well as text that was converted to curves.

For the **Emulation Switching** test, we printed the 10-page Microsoft Word document interleaved with the 1-page CorelDraw document. Each printer was taken off-line until six jobs were lined up and interleaved in the NetWare queue.

For the **Protocol Switching** test, we used text-only documents. Three IP jobs were sent to an NT server, and three IPX jobs were sent to a NetWare queue. Once jobs were lined up in the queues, we turned the printer online and started the timer. For the Multiple Document test, we printed five 2-page text documents. Each printer was taken off-line until a total of five jobs were lined up.

The Test-Beds Each test-bed consisted of four 90-MHz HP Vectra/XU systems with 16MB of RAM and a Quantum 1.2 GB hard disk. Two client machines were set up with Windows 95. Two Ethernet servers were also set up: NetWare 3.12 running IPX and Windows NT 3.5.1 running TCP/IP. We also set up LANalyzer 2.1 on a 486/66 to help analyze and troubleshoot problems. Each test-bed ran on its own isolated network using Asanté 10Base-T hubs.

The network printers in this roundup range from 12 ppm to 40 ppm. Individual reviews describe printer administration and departmental/workgroup printing features.

as that of others in this ppm category, though by just a few seconds. Print quality, meanwhile, is excellent at 600 dpi and, at 1,200 dpi, exceptional. Text is razor-sharp, and halftone images show smooth transitions from highlights to shadows. Printing in 1,200-dpi mode is about 25 percent slower than 600-dpi mode, but it can be justified when you need the highest quality output.—Steven C. M. Chen

Lexmark Optra R+. List price: \$1,749. **Lexmark Optra LXi+.** List price: \$3,249. Lexmark International Inc., Greenwich, CT; 800-891-0331, 606-232-2000; fax, 606-232-2380, <http://www.lexmark.com>. Circle 452 on reader service card.

Okidata

Okidata OL 1200/PS

The Okidata OL 1200/PS is a simple, affordable (with the network card, \$1,839 list) printer intended for small workgroups. Don't expect it to give you fancy remote management or high-volume output, but count on good-looking 600-dpi graphics (interpolated to 1,200-dpi) and excellent PostScript capability. The unit's design gives precedence to out-

put quality over network features.

This printer uses an LED engine rather than a true laser, but output quality is identical. It comes standard with 6MB of RAM (expandable to 34MB), Adobe PostScript Level 2 support, and PCL 5e emulation. You may want to add the optional \$479 Ethernet or \$659 Token-Ring cards; there are no provisions for a hard disk or multiple network cards.

The OL 1200/PS's basic paper capacity, duty cycle, and management tools are adequate for a small- to medium-sized workgroup. Its small footprint (14.4 by 16.9 by 10.6 inches) saves desk space but limits paper-handling options.

Unfortunately the OL 1200/PS cannot handle 11-by-17 paper. The unit's standard paper tray, accessed as a pull-out drawer on the bottom front of the printer, holds 500 sheets. You can configure the machine with a 500-sheet tray (\$299) and a 100-sheet/50-envelope feeder (\$169). The unit's toner cartridge is rated at 5,000 pages with 5 percent coverage—the same as that of most desktop printers—and the image drum's life expectancy is 30,000 sheets.

We had no problems configuring the

printer either to handle IPX operations under NetWare's PCONSOLE or to use TCP/IP under Windows NT. Installing the network card requires only a screwdriver. Hardware setup is handled via the menus on the control panel, which are adequate for accessing the printer's features. The manuals explain the basics but could be a bit more thorough on the benefits of the different options.

Remote-control management is limited to that provided by the network operating system and a sensor on the printer that can broadcast a message to users that the printer is out of paper. It's a far cry from the full-blown JetAdmin software that Hewlett-Packard delivers with its competing LaserJet 5M, but the Okidata's controls are adequate.

Suited for graphics users who don't need 11-by-17 output, this printer delivers enhancements that make working with complex pages and bitmaps more elegant. The OL 1200/PS comes with Adobe's Memory Booster Technology and Okidata's Oki-Smoothing Technology. The memory booster speeds up the printing of graphics and other difficult images. The image-smoothing technology boosts the perceived

IT'S WHAT BLOWS OTHER PRINTERS AWAY.

The outer edge of printing is here.

Home & business gets extreme printing.

Killer 50Mhz imaging processor
boosts performance.

Does way more for way less.

Check out Adobe PrintGear in the new NEC SuperScript™ 860.
www.adobe.com/print
www.nec.com

Posters, watermarks,
N-up, duplex, booklets and more.

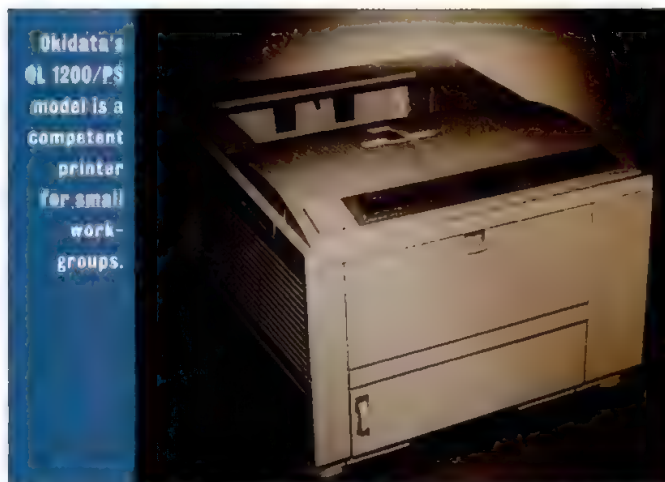


Affordable printers equipped with Adobe PrintGear are ready for anything you want to throw at them. Watch PrintGear help the new NEC SuperScript 860 do more and do it faster than any printer in its class. For more information about Adobe PrintGear call 1-800-833-6687 ext. F1479.



HARDWARE

Network Printers



Okidata's
OL 1200/PS
model is a
competent
printer
for small
work-
groups.

resolution to 1,200 dpi. On our samples, it noticeably improved gray-scale prints and reduced tonal banding compared with what the basic settings produced.

Throughput speed was competitive with that of the 12-ppm HP LaserJet 5M. The OL 1200/PS handled our Protocol Switching test once we installed the proper interface card (labeled Rev. H). The cost per page, at 2.2 cents, is also in line with that of the competition.

If you need high-quality graphics output in a moderate-duty, small workgroup environment, consider the Okidata OL 1200/PS—JK

Okidata OL 1200/PS. List price (with Ethernet adapter): \$1,839. Okidata, Mount Laurel, NJ; 800-654-3282; fax, 609-778-4184; <http://www.okidata.com>. Circle 453 on reader service card.

QMS Inc.

QMS 2425Ex Print System, QMS 3825 Print System



QMS's brand-new QMS 2425Ex Print System printer (\$6,999 list price), with its 24-ppm engine, 600-dpi output, robust paper handling, and excellent CrownAdmin2 administration software, presents some stiff competition to the dominant departmental laser in this arena, the HP LaserJet 5Si MX.

For this review, we also requested QMS's 38-ppm workhorse, the QMS 3825 Print System (\$21,999 list), to see how it stacks up against the production-level Typhoon 40 from Dataproducts.

Both printers are designed around

QMS's Crown multi-tasking software, which provides the intelligence that the printer needs for simultaneous operations, auto-switching emulation support, and other printing features such as usage tracking (for billing or resource allocation). To communicate with the LAN, our test units came with QMS's

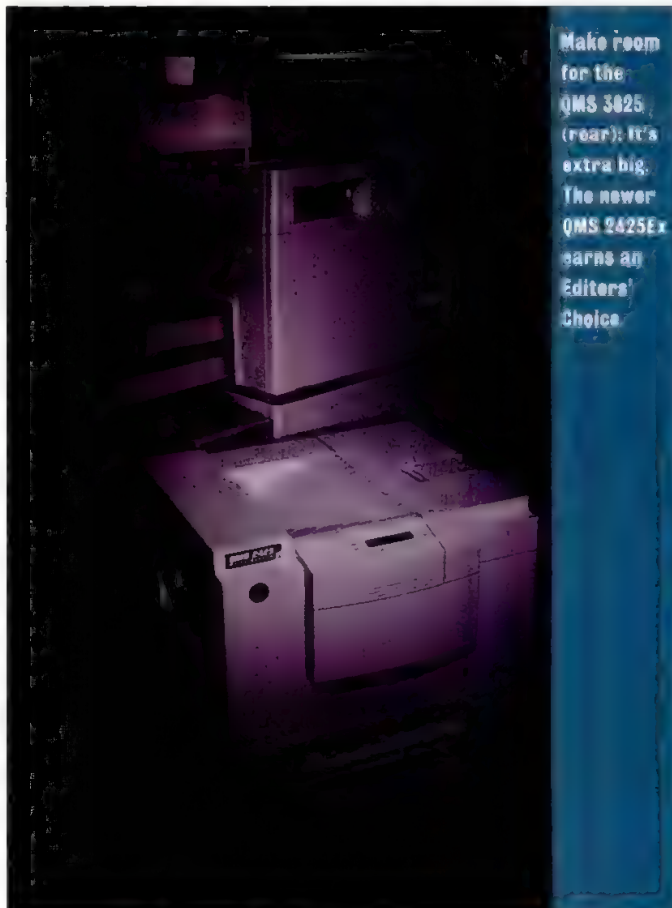
CrownNet multiprotocol network interface card (standard on the 2425Ex; a \$799 option with the 3825), which supports EtherTalk, LAN Manager, NetWare, OS/2 LAN Server, and TCP/IP protocols. This optional interface is also available for Token-Ring and DECnet networks.

Automatic emulation-switching support is accomplished via QMS's Emulation Sensing Processor (ESP) technology. ESP examines the incoming print job and automatically selects and processes the job with its native command language, which QMS claims boosts printer performance. A boost for multiple-copy print jobs comes from QMS's Display List feature. Other printers will need to process a large print job several times to produce several copies, but the Display List (and QMS's generous RAM configurations) let these printers store and print a job from memory. This not only produces jobs faster (especially for processor-intensive graphics files) but also cuts down on network traffic.

QMS provides

one internal hard disk that is used for storing fonts, emulations, and other print features. Print jobs are spooled in RAM (24MB standard on the 2425Ex, 32MB on the 3825) as they enter the printer. In the unlikely event that the print job is too large to fit into RAM, both printers allow you to configure the printer to direct the overflow onto the internal hard disk. You can attach up to three hard disks to the 2425Ex and up to six to the 3825. Another nice touch: Both printers offer an automatic jam recovery feature that reprints pages lost during a jam.

The 2425Ex has a Canon P550 engine and a fast 64-bit NEC VR4300 processor operating at 50 MHz. Standard output resolution is 600 dpi (plus edge smoothing), and that can be pushed to 1,200 dpi with QMS's MultiRes daughtercard (\$499). Two 500-sheet input cartridges are standard, and a 2,000-sheet input deck is available for \$1,299. Capable of printing on paper ranging from postcard size to ledger (11-by-17), the 2425Ex also offers a \$599 envelope feeder that can hold up to 100 envelopes, an option not found on the 3825.



Make room
for the
QMS 3825
(rear): It's
extra big.
The newer
QMS 2425Ex
earns an
Editors'
Choice



SUBSCRIPTION SALE

Answers. Advice. Strategies. Solutions.
22 times a year, you get it all from PC MAGAZINE.



**To reserve big savings,
call toll-free:**

1-800-289-0429

BONUS: Free CD-ROM with your paid subscription!



Underneath it all, we're still the same.

You may not know the name, but you'll surely recognize the face. Beginning with models launched in April, "EIZO" will become the brand name on every new Nanao monitor added to our line.

Each one will carry on the legacy of quality, innovation and performance synonymous with Nanao. In fact, the only difference you'll see is the name on the front of the bezel and the innovations that consistently put us far ahead of our competition.



EIZO monitors will continue to be developed and manufactured by Nanao. You can count on the same leading edge technology, advanced performance and superb construction you've come to expect under the Nanao brand name.

For years, Nanao monitors under the EIZO brand name have been the leading choice of discriminating corporate business users in Europe. You'll soon ask for them by the same name in the U.S.

As you can see, the more things change, the more they stay the same.



NANAQ

© 1996 EIZO Nanao Technologies, Inc. • Phone: 800-800-5202, FAX: 310-530-1679 • FAX ON DEMAND: 800-416-FLEX • HomePage: <http://www.traveller.com/nanao/>
All product names are trademarks of their respective companies.

HARDWARE

Network Printers

Other options include a duplexer (\$599), combination sorter and stapler (\$1,499), and even a copy station. The CrownCopy 300-dpi flatbed scanner (\$1,999) connects via the 2425Ex's SCSI 2 port and can handle bound books or up to 50 sheets of paper with the automatic document feeder.

Our 2425Ex test configuration came with the standard 256MB internal hard disk, 80MB of RAM (the highest of any printer we reviewed here) and the Multi-Res board. To set up the 2425Ex, you need to consult the manual

because several parts are not installed in the unit for shipping purposes, but setup is relatively simple. Moreover, QMS's CrownAdmin2 software is on a par with the best management utilities. You can easily configure and control printers remotely, and the software alerts you to the full range of error conditions. Even better, CrownAdmin2 provides a common interface across Windows 3.11, Windows 95, Windows NT and Unix platforms.

On our performance tests, the 2425Ex was consistently a few stopwatch clicks behind the HP LaserJet 5Si MX on PCL-mode tests, but it bested the HP in PostScript-mode contests. QMS explains that the 2425Ex uses HP's older PCL driver for PCL mode but uses QMS's own PostScript driver, which is optimized for the printer, when it prints in PostScript mode. On the Emulation Switching test, which interleaves three PCL-mode and three PostScript-mode jobs, the 2425Ex had a

pounds, making it a two-man job to put together (though wheels on the bottom of the cabinet make it easy to relocate). Simple maintenance tasks, such as adding toner or clearing paper jams, are easy to accomplish. A series of diagnostic lights

and error messages alert you to the location of the problem.

On speed tests, the 38-ppm QMS was on a par with the 40-ppm Dataproducts Typhoon; output quality was similar as well. Text is fine at 600 dpi, but graphics are produced at 300 dpi and hence show some dotiness not often apparent in this 600-dpi-and-up universe.

The 3825 Print System is for high-speed, high-output, text-intensive applications, and QMS offers the memory, paper-handling, and network administration support you need to add this workhorse to your printer landscape. The

2425Ex Print System also delivers unsurpassed paper handling and network support, plus excellent output quality, in a more manageable package. It is clearly one of the best network printers available.—Padraic Boyle

QMS 2425Ex Print System. List price: \$6,999.

QMS 3825 Print System. List price: \$21,999. QMS Inc., Mobile, AL; 800-523-2696, 334-633-4300. <http://www.qms.com>. Circle 454 on reader service card.

Xerox Corp.

DocuPrint 4517mp, Xerox 4520mp

The recently released DocuPrint 4517mp (\$2,070 list) from Xerox is a solid value for medium or large workgroups. This letter- or legal-capable unit delivers 17-ppm speed and resolution up to 1,200-by-600-dpi, plus a range of options that you can tailor to almost any printing situation.

The 20-ppm, ledger-capable Xerox 4520mp (\$4,070 list, \$3,643 street) is meant to be shared by larger groups. Both

*On a par with the
best management
utilities, QMS's
CrownAdmin2 software lets you control
printers remotely.*

More on this
later today.

Introducing IBM infoSage.
The online information service that
recognizes no two people think alike.

FOUR REASONS WHY PORTABLES



Satellite

When it comes to price, performance and value, nothing comes close to the Satellite Series. These feature-rich models make it possible for everyone to have power and performance in an inexpensive notebook.

Satellite Pro

With Satellite Pro, you can get affordable CD-ROM and portables in a multimedia notebook. This series offers the advanced features and power usually found in much more expensive machines.



Satellite, Satellite Pro, Portégé and Tecra. Quite possibly the best reasons there are for buying a portable computer. Four distinct Toshiba notebook lines assure that whatever your needs, there's one uniquely suited to you. Toshiba portables offer uncompromised

TOSHIBA SELLS MORE THAN ANYONE.



PORTÉGÉ®

The award-winning Portégé® Series defines high performance in ultraportable computers. At under five pounds, these super-lightweight notebooks are packed with features you'd only expect from full-size computers.

TECRA®

Tecra® embodies the absolute latest and greatest in laptop technology. With the fastest Portatop™ processor and most innovative features on the market, Tecra notebooks are the ultimate in power and performance.

quality, and are recognized by the computer industry for technical superiority. And, Toshiba has award-winning customer service and support. That's why Toshiba sells more portables than anyone in the world. Need any more reasons? Call 1-800-457-7777 for more information or a dealer near you.

In Touch with Tomorrow
TOSHIBA

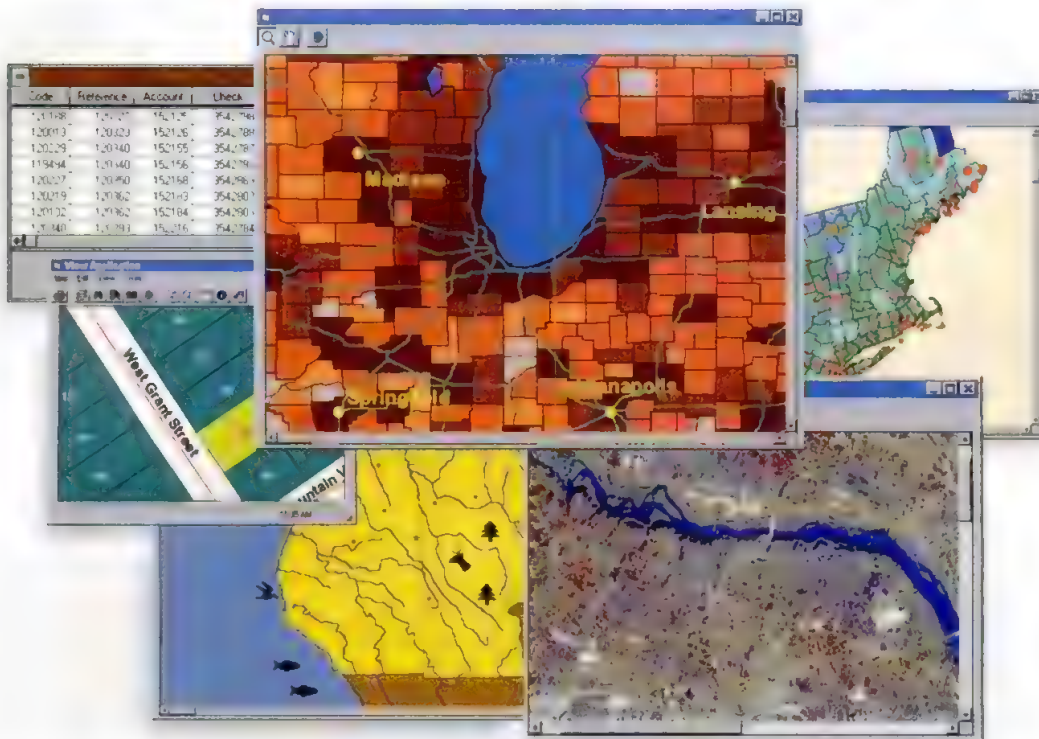
Toshiba. The World's Best Selling Portable Computers.

CIRCLE 379 ON READER SERVICE CARD

This Is Your App...

Code	Reference	Account	Check	Add To	Quotient	Total	Name	Factor	Value
120188	120121	152125	3542785	3542785	1495	1495	OLIVE	0.00106	1452
120013	120223	152126	3542788	3542788	293	45	BELLEVUE	0.00170	244
120229	120140	152155	3542787	3542787	1619	1601	CHELSEA	0.00117	1600
119494	120140	152156	3542790	3542790	157	101	CHANNING	0.00360	100
120227	120150	152158	3542832	3542832	1015	1001	CYPRESS	0.00073	1000
120019	120162	152163	3542835	3542835	1221	1213	FERN	0.00087	1214
120122	120162	152164	3542834	3542834	567	641	NOTTINGHAM	0.00113	640
120140	120163	152165	3542847	3542847	1643	1621	CHELSEA	0.00091	1620

This Is Your App with MapObjects...



With MapObjects, users can

- Pan and zoom through multiple map layers
- Display data using classifications, graduated symbols, labeling, and dot density
- Display a variety of image formats
- Use relational databases and SQL queries
- Perform spatial analysis and query
- Perform address geocoding
- Track real-time events (GPS)

Plus:

Lots of data including streets, census boundaries, ZIP Codes, states, countries, and much more

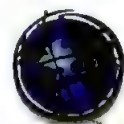
MapObjects™ is a collection of mapping and GIS components consisting of an OLE Control and a collection of over 35 programmable OLE Automation objects. MapObjects is by far the largest component library of GIS software. With very little programming time you can add dynamic, live maps and GIS capabilities to your applications. You can use MapObjects with popular programming environments such as Visual Basic®, Delphi®, PowerBuilder®, and Visual C++.

Because MapObjects is from ESRI, you can be assured you are getting industry-standard, technologically superior mapping and GIS functions. That's because ESRI is the world leader in digital mapping. We have built our reputation by making mapping software that helps you accomplish tasks faster, easier, and better.



MapObjects™

Put a Map in Your App



ESRI

1-800-447-9778

Fax: (909) 307-3039

E-mail: info@esri.com

Web: www.esri.com

International: (909) 793-2853, extension 1235

HARDWARE

Network Printers

printers come with Xerox's fine DS/P (Document Services for Printing) administration software and are worthy contenders.

Xerox's *mp*-designated models come standard with PCL 5e and PostScript support, plus network interface cards (models sans PostScript and the network card are available for about \$700 less). Xerox's DS/P application offers some welcome features. Like other best-of-breed administration utilities, Version 2.0 offers printer-usage tracking and accounting reports and gives the administrator the ability to hold, delete, and release jobs from the print queue. A feature unique to DS/P is what Xerox terms Best Fit:

End users select the criteria they need from the print driver interface (paper size, duplexing on or off, edge-to-edge printing, and so on) and DP/S automatically prints the job to the most suitable printer on the network. Also unlike other utilities, DS/P lets the administrator see and control other brands of printers on the network.

Xerox's other networking features are also noteworthy. These printers can accommodate up to three different network cards, and all three can receive jobs concurrently. So while the printer is busy servicing an Ethernet job, the Token-Ring card can be spooling a job at the same time. Print jobs can also be spooled to an optional internal hard disk (\$475 for 125MB) if network traffic is constant.

There are drawbacks, however. HP's JetAdmin and QMS's CrownAdmin2, for example, are more intuitive to use. At the time of our testing, a Windows 95 version of DS/P was not available, so we ran it on a workstation using Windows 3.1. And that version required us to load a DOS TSR before Windows in order for the Windows software to run correctly.

In its basic configuration, the 4517mp is a little sparse in features, but you can customize it to be just about whatever you need. It comes with a single 250-sheet paper

tray and a 100-sheet multipurpose tray, and you can add up to two 500-sheet auxiliary trays (\$128). There is also a cleverly designed, easy-to-install duplexing unit (\$445) that fits *inside* the small-footprint case. Best of all is the mailbox sorter (\$1,230), which attaches atop the printer and gives you ten lockable bins for output. The network administrator simply assigns a user (or group of users) to a bin, and those print jobs get sorted to the individual bin—no more sorting through stacks of output to find your job

or worrying that others might accidentally walk off with a sensitive or important document.

The printer is rated for 50,000 pages per month, and cost per page is a competitive 2.1 cents. The standard 600-dpi print quality (with resolution enhancement) is excellent: Text is smooth and black areas are solid. Gray-scale images (which we produces at 1,200-by-600 dpi) showed an excellent range of gray levels, with only faint horizontal banding apparent on large images. In terms of performance, the 17-ppm 4517mp was a bit slower in general than the 16-ppm printers in this roundup, though the difference was not enough to be a critical factor for most uses.

The 4520mp is a larger unit meant to be shared by more users than the 4517mp. It comes with three 250-sheet paper trays, and

you can add a 1,500-sheet bin (\$560) if you need more capacity. The 4520mp has a 75,000 page-per-month duty cycle rating, and the cost per page for consumables is about average (2.2 cents). Print quality from the 600 dpi printer (800 dpi with extra memory) was good for text. Gray-scale images were smooth, though they tended to print too dark on the default settings.

The 4520mp was noticeably slow on our performance tests. It was slower than even the 12-ppm models on some PCL tests, which may indicate a performance flaw in that emulation mode.

The 4517mp and 4520mp come with slightly different warranty terms. Both come with one year of on-site coverage, three years of labor, and the Xerox Total Satisfaction Guarantee: Xerox will replace the unit at no cost with the same or an equivalent model if you are not satisfied with the printer while it is under warranty or under Xerox's service contract (up to three years). The difference is that the 4517mp has an 8-hour response time for the on-site service, while the 4520mp has next-day service.

If you don't need 11-by-17 printing, the 4517mp is the better bargain of the two. It delivers more varied options for paper handling (including lockable mail bins) and prints at equivalent speed for about half the price.—AP□

DocuPrint 4517mp. List price: \$2,070. **Xerox 4520mp.** List price, \$4,070. Xerox Corp., El Segundo, CA; 800-349-3769; <http://www.xerox.com>. Circle 455 on reader service card.



*BestFit lets users
select the print
criteria they need,
and then it finds
the best printer for
the job.*

Some people are more connected
than others.



They cruise the Net. They download files. They fax on-line. And now the truly connected will do all this and more from one single software program, new PROCOMM PLUS® 3.0 for Windows. 🌐 New to the world is our Connection Directory, the single source for all your data, fax, voice numbers, email, Web, Telnet, FTP and news entries. Just click on a directory entry and PROCOMM PLUS makes the connection. 🌐 Whether you are just getting started or an expert, the PROCOMM PLUS "Web Zeppelin" browser is the new way to cruise the World Wide Web. Our Internet access automatically helps you set up an account with a national service provider—or connects to your current provider. 🌐 New generation fax comes with an all new Fax Manager, OCR and annotation tools. (*This is very cool!*) And data communications includes 36 terminal emulations, all the most popular file transfer protocols, new RIPscript emulation and a QWK Mail editor to manage electronic mail messages off-line. 🌐 New PROCOMM PLUS 3.0 connects your connections. It's that simple. So call us at **1.800.474.1568** or check us out at **www.datastorm.com**.



CIRCLE 083 ON READER SERVICE CARD

VERY CONNECTED™

Internet • Fax • Data

PC Tech

THE DEFINITIVE GUIDE TO PC TECHNOLOGIES & TOOLS

Java and Java Tools: Waking Up the Web

Java promises new, lively Web pages; tools are beginning to appear to ease development.

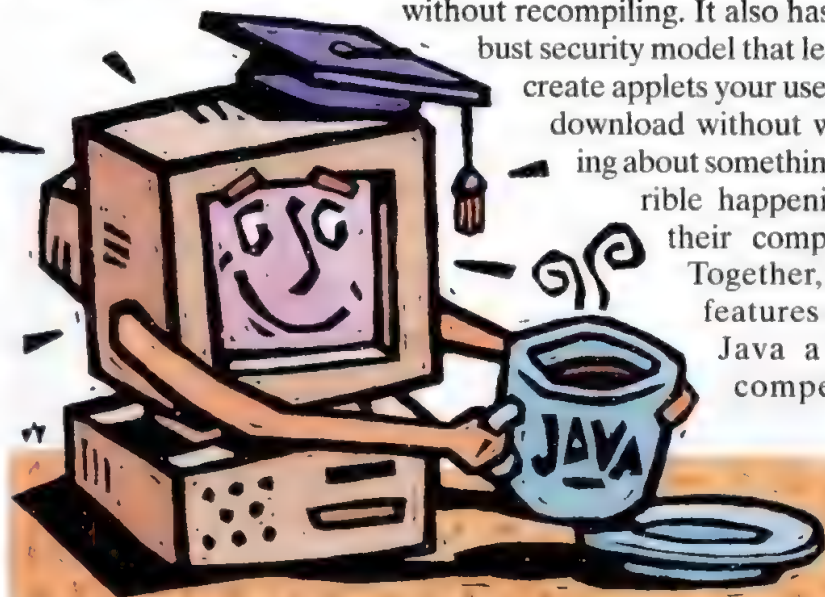
By John Lam

The hottest topic since the Web itself; the coolest tool for developers—that's Java. Interest in Java has grown explosively since its public debut at the SunWorld conference in May 1995, riding the enormous wave of public interest in the Internet. But what is Java, and why has it become this year's Holy Grail? Java offers developers the power to add dynamic, interactive content to Web pages, making today's static pages a thing of the past. Java also has many attractive features for developers interested in creating Internet-enabled applications.

Java is an object-oriented language that allows developers to create platform-independent applications. It produces small, lightweight code that derives much of its functionality from the class libraries already present on client computers. Since Java is an interpreted language, a program written using it can run on many hardware platforms

without recompiling. It also has a robust security model that lets you create applets your users can download without worrying about something horrible happening to their computers.

Together, these features make Java a very compelling



IN THIS SECTION



TUTOR The World Wide Web is a vast, confusing place if you don't have the right tools to help you locate the information you need. Jeff Prosis evaluates a sampling of the best tools for searching the Web, including Alta Vista, Yahoo!, and other sites that combine search tools. Page 235.



POWER PROGRAMMING Visual Basic 4.0 has no built-in means for letting you reuse the toolbars you painstakingly constructed for previous projects. Paul Bonner's Toolbar Wizard is a VB 4.0 Add-In that lets you do just that. Learn the programming obstacles he had to overcome to produce it. Page 245.



INSIDE OS/2 REXX can be used to customize and control most aspects of your OS/2 computer system, including all of the multimedia power inherent in that OS. In the first installment of a two-part article, we examine the inner workings of the multimedia support in REXX, and use it to unleash the dormant multimedia capabilities of your machine with the creation of a full-function CD player. Page 267.



UTILITIES Windows 95's implementation of system hotkeys has some problems. For example, it sometimes allows more than one instance of the same key combination. Our Hotkey Detective utility solves this problem, and lets you keep track of hotkeys in Windows 95. Page 281.

ALSO IN THIS ISSUE In PC Solutions, we present tips on how to speed up some tasks in Windows 95, a software page eject for your printer, a batch file that counts sequentially, more on inserting logos and letterheads in WordPerfect files, macros for using year-to-date formulas in multisheet Excel workbooks, routines that show you how to simulate spinner controls in Microsoft Access, and a discussion of why you need premastering software in order to create high-quality recordings on CDs. Page 307.

tool for developers who want to add the next level of interactivity to their Web sites.

In this article, we will explore several things that are important to developers interested in using Java. First, we'll examine the Java language specification to see what all the fuss is about. Next, we'll take a tour through a sample Java applet that illustrates some common programming themes in Java. Finally, we'll take a look at development environments you can use today to create Java applets.

WHAT'S IT ALL ABOUT?

Java source code can be compiled into either Java applications or Java applets. *Java applications* run as native processes within the Java runtime interpreter, while *Java applets* are downloaded and run within a Web browser such as Netscape Navigator 2.0. Our focus in this article is Java applets.

Java applets are not compiled into machine code. Instead, they are compiled into an intermediate, bytecode format conforming to the abstract Java Virtual Machine specification. The bytecode is then translated by a runtime interpreter on the client computer. Bytecode-based applications have a key advantage over native executable applications: inherent portability. Since the bytecode executes within the Java runtime interpreter, the interpreter can resolve such issues as differences in the instruction sets of the underlying CPU, byte ordering (the "big-endian" and "little-endian" issues), and whether the underlying operating system makes use of Unicode.

You don't need to recompile a Java applet before you can run it on a new target computer: If a Java runtime environment exists on that computer, your unmodified applet will run on it. This portability is what makes Java applets particularly appealing on the Internet. Any number of users, running different Web browsers on different hardware platforms, can download and run the same Java applet you created, thereby leveraging your development investment.

Security is an important requirement for Java applets. Once a Java applet is downloaded to your computer, its functionality must be restricted. In general, Java applets cannot read or write files on the client file system, make network connections (except to the host from which the applet was downloaded), start other applications on the client, make native function calls to the client's underlying operating system, or directly access memory.

These are only guidelines, however, since

the exact implementation of the security model is the responsibility of the Web browser vendor. For example, although Netscape Navigator 2.0 doesn't allow the reading or writing of any files, Sun's AppletViewer, which ships with the Java Developer's Kit (JDK), allows applets to read files that are named on the read-access control list.

The Java security model is easily enforceable: The bytecode you download into your Web browser is subject to a verification process before it is executed. Once the bytecode has been validated, it is executed by the Java runtime interpreter, which further augments Java's security by preventing

direct access to memory: A Java applet (or application, for that matter) cannot read or write directly to memory. If an applet were to have direct access to memory, it could conceivably access the underlying operating system and thereby violate Java's security model.

So, what happens when you read a Java-powered page on your Java-compliant Web browser? How does a Java applet wind up on your computer? Here's the process:

- The Web browser requests an HTML page from the Web server.
- The Web browser receives the HTML page.
- The Web browser interprets the <APPLET> tag, observes that there is a reference to code=app.class, and sends a request to the Web server for a file called "app.class."
- The Web browser receives the app.class file, verifies its bytecode, and begins execution.

As you can see, the Web server's job is to serve up files. Java applets can be served up by any Web server—without any special codes or modifications. And because execution takes place on the client, it is unaffected by bandwidth or HTML limitations.

THE JAVA LANGUAGE

The Java language is based on C++, but with C++ features that are seldom used or would potentially violate Java's security model removed. What remains is a simple, object-oriented, multithreaded language whose features include a single-inheritance class hierarchy, strong typing, support for multiple threads of execution, automatic garbage col-

lection, and the use of references only (no pointers).

The primitive data types Java supports are familiar to most developers (see table). Note that neither unsigned integers nor any pointer types are supported. But since Java does not allow native operating system calls, this should not pose a problem for most developers.

Java classes support only single inheritance: A Java class can inherit from only a single ancestor class. This is done using the keyword *extends*, as in

```
public class foo extends Applet
```

The keyword *public* means that the class is visible to classes outside of the current source file.

Java classes also support the use of interfaces, which represent a group of related functions exported by a Java class. By using interfaces, you gain several important advantages. First, since an interface defines a constant view of your object, you can separate how someone uses your object from how you implement the functionality of that object. Second, since a Java class can implement multiple interfaces, you gain some of the benefits of multiple inheritance, despite the fact that Java disallows it. Finally, an extremely important feature comes from the close relation between Java interfaces and Interface Definition Language (IDL) interfaces. This kinship allows you to use Java to build distributed objects that conform to the Common Object Request Broker Architecture (CORBA) or Component Object Model (COM) specifications.

Java is a *strongly typed* language. This means that Java tries to resolve all types at compile time. If you reference an invalid type,

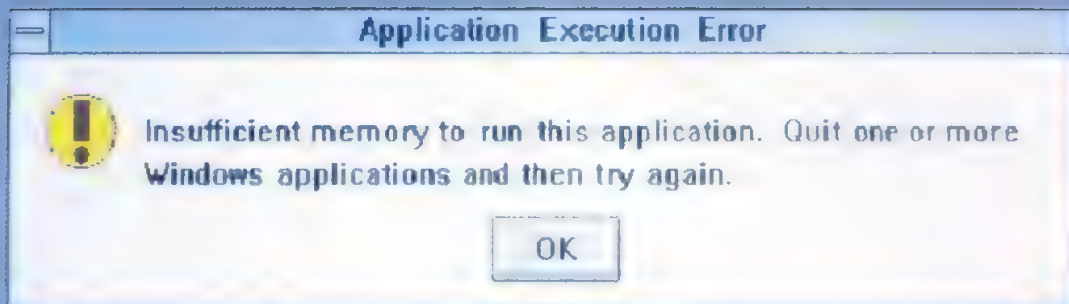
LIFE CYCLE OF A JAVA APPLET

The arrows show the events that take place in the browser; the circles represent the corresponding functions in the Java applet class called to handle those events.

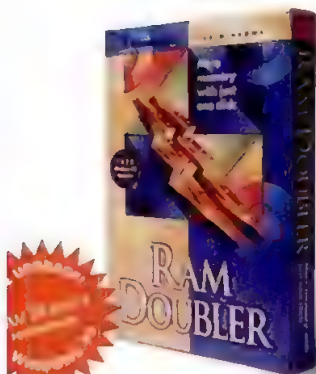


or perform an invalid typecast, Java will flag that error at compile time. As with other object-oriented languages, Java allows polymorphic behavior; that is, you can refer to an object without specifying its exact class.

Java uses reference-counted classes and automatically increments an object's reference count whenever a piece of code refers to that object. When a reference to an object goes out of scope, Java automatically decrements that object's reference count. When the reference count of an object reaches 0, the object becomes a candidate for *garbage collection*. A separate garbage-collection



FINALLY, SUITE SUCCESS.



RUN ALL YOUR APPLICATIONS AT ONCE.

Whatever productivity software you're running now—RAM Doubler™ will improve it by letting you open all your applications at once. Even for non-suite users, RAM Doubler eliminates that nasty little "insufficient memory" message forever. How? By reclaiming unused memory, compressing existing memory and managing system resources more efficiently. It's the first software product to allow multitasking with just one click. And with over 1,000,000 satisfied customers, RAM Doubler is far and away the worldwide leader. RAM Doubler installs in 15 seconds, instantly increases system performance and helps you become more productive.

"RAM Doubler for Windows works like a charm. The rewards are most evident if you keep several Windows applications open at once." —Jim Seymour, PC Week

	RAM Doubler	Winram	3dRAM	MemRAM
Over 1 Million Users Of The Technology	✓			
Completely Automatic—No Adjustments Required	✓			
Uses Third Generation Patented Technology	✓			
Increases System Resources	✓	✓		
Flows Memory Below 1MB	✓	✓		
Uses Compression To Double Applications Memory Space	✓	✓	✓	✓
Doesn't Modify Extension.hal Or Config.sys	✓			✓

Buy RAM Doubler today wherever fine computer products are sold (SRP \$99). It comes with a 30 day money back guarantee and lets you run all your applications at the same time. With RAM Doubler suite success has never been easier!



SYSTEM REQUIREMENTS: A PC equipped with a 386, 486, Pentium or equivalent processor. Windows 3.1 or 3.11, Windows for Workgroups 3.11 or 3.11, running in 386 enhanced mode. 4 MB RAM required, 6 MB RAM recommended. RAM Doubler for Windows works in tandem with any DRAM memory extender, such as QEMM or Memosoft. © 1995 Connectix Corporation, 2655 Campus Drive, San Mateo, CA 94403 USA. 800.839.3628 • 415.571.5100 • FAX: 415.571.5195. RAM Doubler is a trademark of Connectix Corporation. All other trademarks are the property of their respective holders.

CIRCLE 369 ON READER SERVICE CARD

thread runs within the Java interpreter, taking care of freeing the memory associated with objects with a reference count of 0.

Java provides support for *multithreaded* applications. Each instance of a class can be run as a separate thread if it is subclassed from Thread:

```
public class Foo extends Thread
```

But this is suitable only for very simple classes that do not need to be subclassed from

anything else. Because Java does not support multiple inheritance, you can't use inheritance to add threading capabilities to your class. If you implement an interface called Runnable in your class, however, Java will add threading support by allowing you to create a new Thread object that may or may not be external to your class.

A SIMPLE JAVA APPLET

The best way to get a feel for any language is to start using it. Rather than the ubiquitous "hello

world" example app, we will create a sample applet that animates the *PC Magazine* logo, moving it left and right within a box. This applet will illustrate several of the important concepts in Java programming, such as a class with support for threads, multiple interfaces in a single class, simple animation, parameter passing from the HTML page that contains the applet, obtaining additional files from the Web server, exception handling, and event handling.

We'll examine how the applet is created, how it initializes itself, how it animates the

The State of Java Tools Today

By John Lam

C++ developers are accustomed to using integrated development environments (IDEs). Since the Java language is very similar to C++, it seems fair to evaluate Java development environments relative to existing C++ development environments. Not surprisingly, the Java development environments we'll look at here are either close relatives of or add-ons to existing C++ development environments.

Developers expect five major features from an IDE: source-code editing and browsing, application-resource editing, integrated compiling, integrated debugging, and online help. We'll evaluate the Java development environments in terms of these categories, the most important of which is perhaps online help: When learning a new language, it is beneficial to have rapid access to documentation about the language and its class library.

TODAY: THREE CONTENDERS

At the time of this writing, three environments are available for creating Java applets and applications in Windows 95 and Windows NT 3.51.

The Java Developer's Kit (JDK), Version 1.0, from Sun Microsystems, contains the Java compiler, the Java runtime libraries for Windows 95 and NT, and a simple

command-line debugger. We'll also discuss two products that ship with JDK, significantly enhancing it: Symantec Corp.'s Symantec Café and Borland International's Borland C++ Development Suite 5.0.

THE JAVA DEVELOPER'S KIT

The JDK, Version 1.0, provides a minimal set of the tools and documentation you need to create Java applets and applications. The tools include the Java compiler, the Java Appletviewer, and a simple command-line debugger. The required Java class libraries—with source code—also ship with the package. To help you get started, the JDK includes a set of documentation for the Java class libraries and a variety of sample Java applets.

Unfortunately, the JDK does not provide tools that let you create Java applets easily. The documentation is not searchable, as is the case with standard Windows help files. (Luckily, a port of the Java class-library documentation to Windows help-file format is available, at <http://www.dippybird.com/java.html>.) The JDK does not include a Java source-code editor, a make tool for your Java projects, nor an easy way for creating your Java applet's visual elements. Longtime Windows programmers will be reminded of those days when they had to create dialog resources using Notepad.

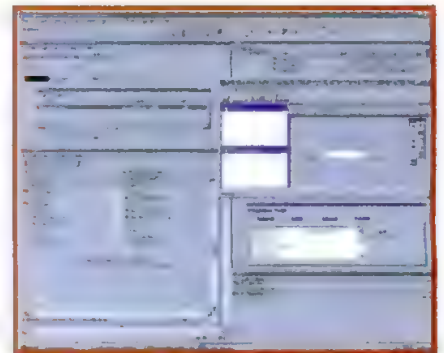
The one thing you can't complain about, however, is the JDK's price: You can download it for free from Sun's Java Web site. Use the JDK to take a look at what Java is all about before deciding whether you want to purchase a full-blown Java development tool. At the least, you can compile the sample applets using the compiler and write a simple applet to get your feet wet. But when you're ready to do more than that, you'll want to get a real development environment.

The Java Developer's Kit 1.0. List price: Free. Sun Microsystems Inc., Mountain View, CA; 800-821-4643, 415-960-1300; <http://www.javasoft.com>. Circle 447 on reader service card.

SYMANTEC CAFÉ

Symantec Café is a standalone Java development environment based on Symantec Corp.'s excellent C++ development tool. Not surprisingly, Café incorporates many features from that product, providing a very complete environment for creating Java applications and applets.

Managing a project's source-code files

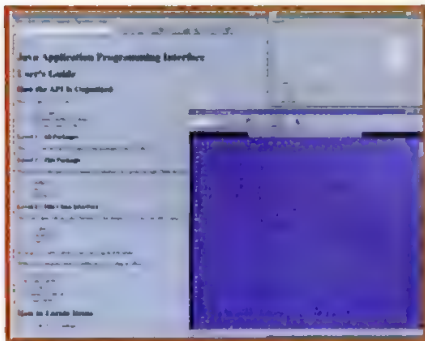


The Symantec Café Resource Editor, with a form opened up in its window.

and their associated windows is a task that IDEs try to simplify for developers. Café makes it easy to manage these windows, by creating a set of virtual desktops that are navigable with a simple tab control. Café groups these desktops into five categories: Editing, Project, Output, Desktop, and Debugging. Within each desktop, you can customize the appearance and layout of the individual source-code windows.

Navigating and editing the source files in your project are also important. Café lets you navigate by file or class, plus provides syntax highlighting of your Java source files during editing. The editor is also tightly integrated with both the help files and the compiler. When a compile-time error occurs, you can jump directly from the error message in the output window to the line in your source-code file where the error was detected.

Café's bytecode compiler really shines. In



The Java Developer's Kit, with our sample applet running in the Sun AppletViewer.



.GIF file, how a user interacts with it during its lifetime, and, finally, how it gets destroyed.

The first thing you must do when writing a new Java applet is to create a new class that subclasses from the `java.applet.Applet` class. In our applet, this new class is called `Simple`, and it implements several member functions that are called by the Java runtime environment at different times throughout the lifetime of the applet (see diagram). These member functions are `init()`, `start()`, `stop()`, and

`destroy()`. The `init()` function is called the first time an applet is loaded by the Web browser. The `start()` function is called when the Web page is activated by the browser (that is, when a user first visits or again visits the page), and the `stop()` function is called when the user leaves the page. As a good Java citizen, you should suspend the execution of your applet when the Web browser calls your `stop()` function. The `destroy()` function is called only when the browser unloads the applet from memory. At that point, you free any

resources you may have created.

Java calls our applet's `init()` function to perform per-instance initialization of the applet. The applet uses parameters from the HTML page that launched it to define how large it will display on the screen. The parameters are set up inside the `<APPLET>` tag in the HTML source file:

```
<APPLET CODE=Simple.class WIDTH=300
HEIGHT=300 STEPSIZE=10 INTERVAL=100>
</APPLET>
```

contrast to `javac`, the Java compiler that ships with the JDK, Café's compiler is fast, making the entire compile-test-debug cycle much quicker. The Java runtime environment has also been optimized, resulting in Java applications that run much more rapidly than was possible with the runtime environment that ships with the JDK. Keep in mind, though, that it's the implementation of the Java runtime environment on the receiving system that determines your applet's performance in the eyes of the end user.

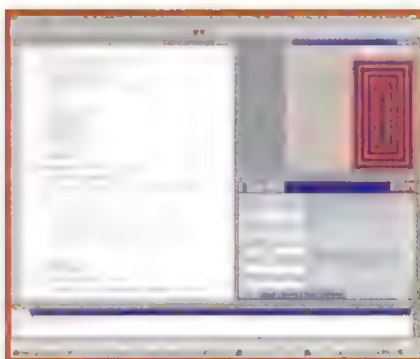
Café has an integrated debugger that provides the features with which C++ developers are familiar. Café also supports simple or conditional breakpoints, call-stack tracing, watch expressions, single stepping, and procedure stepping. You can even debug multithreaded Java applets on the fly.

The Java language specification does not define resources, but Café uses a Windows resource editor to lay out the user-interface widgets you use in your Java applet. This allows you to drag and drop the widgets onto a form and to attach event handlers to them. Café maintains this information in a Windows .rc file and generates the Java code required to lay out the user-interface widgets on the form. You can add an event handler to a button's click-event by clicking on the button, selecting the Events tab of the button's property sheet, and selecting the click-event. Café will then create a stub procedure for you and take you to that procedure in the editor, so that you can add your event-handling code.

At this writing, Symantec Café represents the best option for most Java development. For more information, see this issue's

BORLAND C++ DEVELOPMENT SUITE 5.0

In the new Borland C++ Development Suite 5.0, which includes a set of Java add-on tools, Borland capitalizes on its award-winning C++ environment to deliver a productive IDE for creating Java applications and applets. But the Development Suite is not a standalone Java development environment; some inconsistencies in



The Borland Development Suite, with Java add-on showing AppExpert for Java.

Borland's approach detract from this product's appeal.

The Development Suite is an excellent environment for browsing and editing source-code files; it obviously benefits from the project management and file-browsing support that have made Borland's IDE such a productive environment. The Development Suite provides project file management, integrated version control with PVCS, and a syntax highlighting editor.

It also has AppAccelerator, one of the first implementations of a Java just-in-time compiler. AppAccelerator compiles the bytecode generated by the Sun `javac` compiler into native machine instructions prior to execution. This can provide a significant

mine how quickly your Java applet will execute.

The Development Suite falls short in the Borland Graphical Debugger. The debugger, itself written in Java, must be launched inside the Java runtime environment before your application is launched. Borland's debugger supports most of the features developers require, such as breakpoints, watches, and a call-stack trace, but it is slow and not always reliable. It also takes an inordinate amount of time to begin a debugging session, and the debugger itself is prone to crashing.

Sadly, the Development Suite does not support graphical form building; thus, you must calculate by hand the coordinates of various user-interface widgets, then hard-code these values into your application. The Development Suite also lacks support for hooking up events to the widgets, so you must hand code the handlers for the events you want handled. Though not absolutely essential, these features are important time-savers that must be addressed in future releases.

The Borland C++ Development Suite 5.0. List price: \$499.95. Borland International Inc., Scotts Valley, CA; 800-645-4559; <http://www.borland.com/>. Circle 449 on reader service card.

STOP THE PRESSES

Several new Java tools appeared too late for this roundup. Rogue Wave (<http://www.roguewave.com>) recently announced its JFactory development environment, and Microsoft previewed its Jakarta development environment at its Internet Professional Developers' Conference. At the Software Developers' Conference, Sun Microsystems showed off a beta of Java

visio

Graphics
technology

that will
change the way
you work.

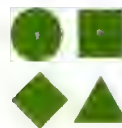
Look who's using it.

Try it.

How you look



Amoco is saving 5% per project or up to 20 million dollars by using Visio to better plan and manage its oil exploration. Other companies use it to save time. Still others to increase productivity. You'll find lots of companies have adopted Visio. Companies such as Chrysler, National Semiconductor and Fluor Daniel.



Look at things with Visio and suddenly everything becomes

clearer. You can see gaps in your organization, conflicts in

timelines or weaknesses in process flow. No, you don't have

some secret sixth sense. You have graphics technology

that can be integrated in every department, across your

entire company. Our SmartShapes® symbols let you create

network diagrams, organizational charts and engineering

at things schematics that are both intuitive and intelligent. Visio and

can profoundly affect

what you see

Visio Technical are also fully compatible with Word, Excel,

Lotus Notes and AutoCAD. If you're ready to see more, call

800-24-VISIO, ext. B37. For corporate evaluation call 800-VISIO-07.



<http://www.visio.com>

It's A Snap!

PhotoWorks is the best way to edit, capture, catalog and enhance your photographs

**ONLY
\$49.95**

Cataloging

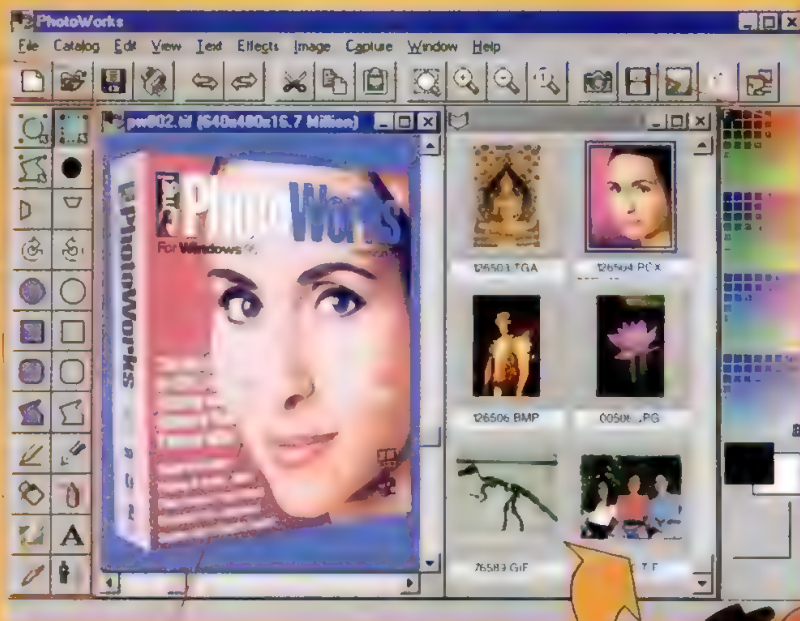
PhotoWorks lets you organize your photographs, images, sound, music and video files quickly and easily. Create and maintain your personal multimedia catalogs.

Tools

PhotoWorks' wide assortment of image manipulation, paint and drawing tools lets you add your own creative flair to any image quickly and easily.

Colors

Color correct images, change colors, backgrounds, adjust contrast, brightness and more.



Presentations

Create your own multimedia slideshows for family, friends and business presentations in just minutes.

FREE BONUS!

PhotoWorks now includes a multimedia library containing hundreds of photos, sound files and animations, all license and royalty FREE!

Internet Helper

Image display, editing, cataloging and screen capture for Internet, America On-line, CompuServe, Microsoft, Prodigy and other network access software.

Digital Magic

Retouch, enhance or add special effects like grayscale, emboss, mosaic and reverse color to any image at the touch of a button.

Photos on your PC

Now it's a snap to put photos on your PC! Just drop off your next roll of film at a photo outlet and request a Kodak CD-ROM or floppy disk with your prints.



PhotoWorks™

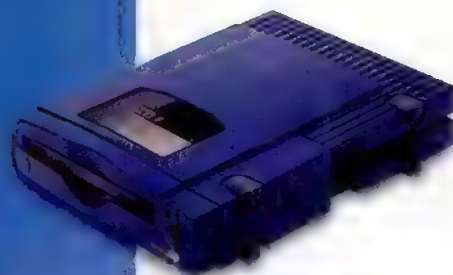
For product information call 1-800-403-4835 or visit us on the World Wide Web at www.mgisoft.com.



Versions are available for Windows® 95, Intel/Pentium versions of Windows NT™, Windows® 3.1 and the Power PC under Windows NT™. * Estimated street price. © Copyright 1989-1996 MGI Software Corp. All rights reserved. PhotoWorks, the PhotoWorks logo and the MGI logo are trademarks of MGI Software Corp. All other product names are trademarks or registered trademarks of their respective trademark holders. CIRCLE 004 ON READER SERVICE CARD

INTRODUCING
THE ONE DRIVE
for all your stuff.

NO MATTER HOW BIG.



**The One Drive
For All Your Stuff.™**

Endless storage space.
Hard drive expansion.
Portable files.
Fast, easy backup.



**100MB disks
for as low as \$14.95.**

Perfect for home stuff,
school stuff, and work stuff.
One disk holds
as much as 70 floppies.



Get your Zip stuff at:

Comp USA
Micro Center
Best Buy

PC&Mac Connection
800-600-8352

Seems everything's getting bigger these days. You know, bigger software programs, bigger files, all that multimedia stuff. Where are you going to put it all? On your Iomega Zip® drive. The floppy drive for the multimedia age. The Zip drive hooks right to your computer—Mac or PC. And each Zip disk holds 100 megabytes of stuff. Plus, it's all easy to use and install thanks to Zip Tools™ file management software, free with your Zip drive purchase. Buy a Zip today and give yourself room to grow. Or, if you prefer, room to really grow.

BECAUSE IT'S YOUR STUFF.

CIRCLE 002 ON READER SERVICE CARD



Microsoft ActiveX Technologies

Is Java the only game in town for creating interactive Web applications?

Not anymore. At the Internet Professional Developers' Conference (PDC), Microsoft announced its ActiveX technologies for creating interactive Web applications. These advances include client technologies, server technologies, tools, and applications.

Three main components make up the ActiveX client technologies: ActiveX Controls, ActiveX Documents, and ActiveX Scripting. At the PDC, Microsoft released the ActiveX Development Kit, which is available for free downloading at Microsoft's Web site (<http://www.microsoft.com/intdev/sdk/>). The kit contains documentation, sample code, and code libraries that allow you to start building ActiveX client applications using the ActiveX technologies.

ActiveX Controls function just like traditional OLE Controls (OCXs): They can reside locally on a client machine or they can be downloaded from the Internet. You can use ActiveX Controls to handle client-side interactions with the user. An ActiveX Control may be as simple as a button or as complex as a reporting tool. Since the same ActiveX Controls can also be used inside Visual

Basic, you can expect to see a proliferation of ActiveX Controls that you'll be able to use in your Web pages.

Developers can use ActiveX Scripting to coordinate the activities of ActiveX Controls on their Web pages. Currently available ActiveX Scripting languages are VBScript and JavaScript. These scripting languages use OLE Automation to communicate with an ActiveX Control; the ActiveX Control fires OLE events that can be handled in the ActiveX Script code in response to user interactions (such as clicking on a button in the ActiveX control).

ActiveX Documents are an exciting piece of technology. Using Microsoft Internet Explorer 3.0, you can view active documents as well as HTML pages. In addition, you can allow users to navigate, view, and edit the contents of documents that can't be rendered using straight HTML alone—all within a Web browser, thus providing users with a consistent interface. The forthcoming Explorer upgrade (code-named Nashville), which will be released later this year, will allow you to browse your local hard disk, your local area network, or the Internet from within the same user interface.—John Lam

We need to get these parameters before the applet appears on the Web page. By calling the `getParameter()` function, which is implemented in our `java.applet.Applet` superclass, we can obtain the parameters from our Web page. The `getParameter()` function returns a `String` object that must be converted to a simple `int` value. The lines of code

```
String ap = getParameter("STEPSIZE");
stepSize = (ap != null) ?
Integer.valueOf(ap).intValue() : 5;
```

demonstrate Java's interesting use of classes to perform the required type conversion. In the first line, we create a new `String` object and initialize it with the `String` returned from the `getParameter()` function. The second line of code shows how Java allows you to refer to a class as though it were an object. Java automatically instantiates an `Integer` object to perform the actual type conversion.

Our applet must also download the .GIF file for the *PC Magazine* logo from our Web server. We initiate the download by calling a member function of the `Applet` class, `getImage()`, which takes two parameters, a URL and a filename, and returns an `Image` object. For security rea-

sons, a Java applet cannot establish network connections to hosts other than the one from which it was downloaded. Therefore, the applet uses the function `getCodeBase()` to obtain the only URL it can access, our applet's host.

Next, we need to know the dimensions of our `Image` object. Rather than hard-coding the size of the .GIF image into our applet or into parameters embedded in the HTML page, we can ask the `Image` object to tell us its size. But one of Java's underlying design considerations makes this less simple than you'd think: Java intentionally defers the actual transfer of objects over the Internet until it absolutely has to (that is, until it must render the image on the screen). Simply calling `getImage()` does not actually load the .GIF image. Instead, we must *asynchronously* request the size of the `Image`. To support such asynchronous processing, Java uses a callback interface. Our `Simple` class implements an `ImageObserver` interface which contains a single function, `imageUpdate`. This function is called with the size of the image passed in its parameter list when the image is actually loaded into memory, and its dimensions become known.

Once our applet has been initialized, we're ready to start execution. The `Simple` class is

multithreaded, but since our class already inherits from the `java.applet.Applet` class, we can't use inheritance to add threading capabilities to our class. Instead, we must implement the `Runnable` interface with its single member function, `run()`. This is the member function that will be called from an externally created `Thread` object when it is time to start running our `Simple` class.

When the browser is ready to start our applet, it will call the applet's `start()` function. At this point we create a new thread object, `moveImage`, which controls the execution of our `Simple` object. We then call the `start()` member function of `Thread`, which in turn calls our `Simple` object's `Runnable` interface's `run()` function.

The `Runnable` interface controls the execution of our `Simple` class. `Runnable`'s `run()` function contains an infinite loop: a `while (true)` statement block with a `try ... catch` block nested within it. This is a good illustration of Java's exception-handling abilities. The exception handler looks for anything that interrupts the execution of our thread (such as the user pressing Ctrl-C in the `AppletViewer` that ships with the JDK). When an exception occurs, we destroy the thread from within which we were executing and exit the `run()` function.

How do we animate the *PC Magazine* logo? The `run()` function puts the thread to sleep after the thread has moved the `Image` object one step to the left or to the right. If `run()` detects that the `Image` has reached the left or right boundary of the applet's viewable area, it reverses the direction of the box and sends it the other way. Upon waking, `run()` causes the applet's viewable area to be repainted.

Java, as with any language used for creating applications that run inside a graphical user interface, must provide handlers for system messages. For example, when the operating system requires that our window be repainted, say in response to a user moving an overlapping window to reveal our applet's window underneath, the OS will inform us, and the `Java` `paint()` function will handle the task. The `paint()` function takes a single parameter, a `Graphics` object, which is an encapsulation of a logical drawing surface. The `paint()` function takes care of the issues involved in rendering our logical drawing surface using the underlying operating system's API functions. We use the member functions of the `Graphics` class to draw our *PC Magazine* logo onto a logical representation of the window within which our applet is executing.

To see the applet, visit *PC Magazine's* Web site (<http://www.pcmag.com>). You can download all of the source code from *PC Magazine Online*. □

John Lam is the director of software development at Continuous Research, a company specializing in the creation of OCX-based tools for developers.

"The Best Way to Bring Pictures Into Your PC"

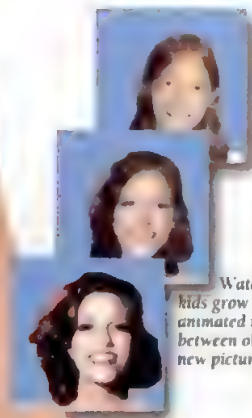
SNAPPY Brings Stunning Pictures From Video Into Your PC

Play's Snappy lets you grab sensational PC stills from any camcorder, VCR or TV. It's easy! Just plug Snappy into the printer port on the back of your desktop or laptop PC. Then connect any video source to Snappy with the included cable. Watch your PC screen and when you see the picture you want, click Snap. It's really that simple. For the first time ever, ANY scene your camcorder can see, ANY tape in your VCR or ANY show on TV can be a perfect still on your PC.

With the press of a single button, Snappy captures breathtaking images in 16.8 million vibrant colors at record-breaking resolutions up to 1500 x 1125. It's perfect for thousands of uses from desktop publishing, presentations, databases, faxing and Internet pictures, all the way to PC photo albums, school reports or just morphing your friends into celebrities grabbed from TV. Snappy is already the USA's best-selling PC video add-on. Hundreds-of-thousands of PC users are surprising their families, amazing their friends and impressing their clients with awesome stills grabbed right from video. Snappy is the technology breakthrough that makes your PC more powerful, more visual ... and more fun!



Only \$199⁹⁵
Approximate Suggested Price



FREE GIFT!



\$300 worth of award-winning software
Buy a Snappy and you'll also get Fauve Matisse SE for paint, retouching and titling and Gryphon Morph for morphing, warping, and special effects.

Have Reviewed!

"the results are astonishing... Get one—you'll love it"
—PC Magazine

"produces terrific video stills... the best we've ever seen"
—Windows Sources

"For the first time, you can get print-quality images from video"
—Camcorder Magazine

Hot Awards!



PLAY
INCORPORATED

2000 Kilgore Road,
Rancho Cordova, CA 95670-0103
916.961.0000 • FAX 916.961.0001



FREE Demo Disk
Call 800.306.PLAY,
or get the demo right
now on the Internet at
<http://www.play.com>



Swan Delivers Award-Winning Products

Microsoft® Windows NT™ Now Available on Swan PowerHouse!

Quality PCs and Relationships

Since 1984, Swan Technologies has built competitively priced, high-quality personal computers and long-lasting relationships with our customers. Because we listen to you first, we can build a customized PC to exceed your expectations. Our goal is nothing less than your complete satisfaction.

Life-Time Toll-Free Support

When you have a question, Swan will be always be there. We offer lifetime toll-free support to all our customers. We're always focused on ensuring that our customers get the information—and tools—they need to stay productive.

Satisfaction Guaranteed

We offer a no-hassles 30-day money-back guarantee. Plus, there's our one-year free on-site support including parts and labor.

Swan Express Next-Day Delivery

When you need your new computer immediately, look for the Swan Express icon. These systems are available for immediate delivery. Just call us by 1pm EST and your system will be shipped the same day.

Custom-Configuration For You

Swan will gladly custom-build a system to order. And when we say custom-build, we mean it. Many companies can make minor adjustments to a pre-configured system and call it "customized." Swan will build a PC from the ground up just for you, to meet your exact requirements and our demanding quality standards.

World Class Build-To-Order

At Swan, we never cut corners on product quality. We believe it's "quality in, quality out"—a quality you'll appreciate even if you never see the inside of your computer.

Windows® NT / '95 Choice

Swan gives you the option to choose between Microsoft® Windows® 95 or Microsoft Windows® NT. For our Family, Office and

Notebook systems, you can also select MS-DOS® and Windows for Workgroups® 3.11 (pre-installed).

Quick & Smart Business Leasing

Leasing your PC from Swan has never been easier. Swan offers affordable payment plans that are designed to meet your business' monthly budget. Leasing options are available to all qualified business customers through the nation's top leasing organizations, including AT&T Capital Leasing Services and Trans Leasing International. Swan's business leasing offers the lowest possible monthly rates, lease-to-own options and terms of 12-60 months. A Swan Sales Consultant can provide details on the benefits and terms of each option.

Free Swan Product Catalog

Swan offers a full line of PC products, notebooks, servers and peripherals. Call today to receive our FREE catalog on all our products and customer services.



PowerHouse 133MHz

Designed for maximum performance, the PowerHouse features EDO DRAM and synchronous pipeline burst SRAM. With a standard 1.6GB hard drive, 6X CD-ROM and MPEG, the PowerHouse is the power-user's system of choice.

- 133MHz Intel® Pentium® Processor
- 16MB EDO Memory, Expand to 128MB
- 256K Pipeline Burst Cache
- 1.6GB EIDE Mode 4 Hard Drive
- 6X EIDE CD-ROM Drive
- 64-bit PCI Graphics Accelerator with 2MB EDO Memory and Software MPEG
- Intel® 430FX Chipset
- 2Mbit Flash PnP BIOS, For Easy Upgrades
- Type 7 ZIF Socket Upgradability
- New—Intel® PIIX3 PCI Xcellerator™ BUS Mastering Disk Controller
- PCI 2.1 Compliant, Concurrent PCI DMA Support
- 6 Expansion Slots: 3 PCI, 2 ISA, 1 PC/ISA
- 3.5" Floppy Drive
- 15" .28mm Flat Screen Color Monitor
- 2 High-Speed Serial Ports, 1 Parallel Port
- Microsoft® Windows® NT or Microsoft® Windows® 95
- 104 Key Keyboard and Mouse
- Mid-tower Case
- Internet Access Software
- One Year On-site Parts and Labor Warranty

\$1949



LEASE
\$72
a month

PowerHouse 150MHz

\$2049

PowerHouse 166MHz

\$2199



1992



1992



1993



1993



1993



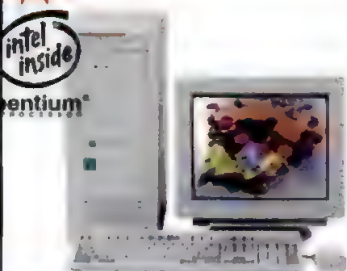
1994



1994

Product and Service. Since 1984.

NEW! SwanNote-Plus/CD Multimedia Notebook with 6X Internal CD-ROM!



PowerHouse-Deluxe 166MHz

All the standard features of the PowerHouse system, plus Microsoft® Office Professional, a 2.0GB hard drive and even popular business CD-ROM titles.

- 166MHz Intel® Pentium® Processor
- 16MB EDO Memory, Expand to 128MB**
- 256K Pipeline Burst Cache
- 2.0GB EIDE Mode 4 Hard Drive**
- 6X EIDE CD-ROM Drive**
- 64-bit PCI Graphics Accelerator with 2MB EDO Memory and Software MPEG
- Intel® 430FX Chipset
- 2Mbit Flash PnP BIOS, For Easy Upgrades
- Type 7 ZIF Socket Upgradability
- New—Intel® PIIX3 PCI Xcellerator™ BUS Mastering Disk Controller
- PCI 2.1 Compliant, Concurrent PCI DMA Support
- 6 Expansion Slots: 3 PCI, 2 ISA, 1 PCI/ISA
- 3.5" Floppy Drive
- 15" .28mm Flat Screen Color Monitor
- 2 High-Speed Serial Ports, 1 Parallel Port
- Microsoft® Windows® NT or Microsoft® Windows® 95**
- Microsoft® Office Professional**
- 7 Popular Business CD-ROM Titles**
- 104 Key Keyboard and Mouse
- Mid-tower Case
- Internet Access Software
- One Year On-site Parts and Labor Warranty

\$2449 LEASE \$90 a month

PowerHouse-Deluxe 133MHz \$2199
PowerHouse-Deluxe 150MHz \$2299



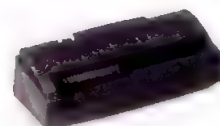
SwanNote-Plus/CD P120

Experience the ultimate in multimedia notebooks. Ergonomically designed with the latest technology—all in one sleek, compact package.

- 120MHz Intel® Pentium® Processor
- 11.3" Active-Matrix 800x600 Color Display**
- 8MB DRAM, Expandable to 40MB
- 810MB Removable EIDE Hard Drive, Upgrade to 1GB
- 6X CD-ROM Internal Module**
- 256K Synchronous Pipeline Burst Cache
- Intel® 430MX Mobile Chipset
- 6.8 lbs. (with CD-ROM Drive)
- 32-bit PCI Local Video Bus, 1MB DRAM, Upgrade to 2MB
- 16-bit Stereo Audio, SoundBlaster Compatible
- 3.5" Modular Floppy Disk Drive
- Dimensions 11.1"W x 8.66"D x 1.89"H
- TrackPad Ergonomic Pointing Device
- Built-in Microphone and Stereo Speakers**
- LCD System Window Display, LED Status Indicators
- Lithium Ion Battery with Universal AC Adapter
- Infrared IrDA Port**
- Flash BIOS
- 2 Type II/1 Type III PCMCIA Slots
- 84 Key Keyboard
- MS-DOS® and Microsoft® WFW 3.11 or Microsoft® Windows® 95 (Installed)**
- One Year Factory Parts and Labor Warranty

\$3359 LEASE \$117 a month

P100 Active-Matrix \$3299
DSTN Pricing Call



SwanNote-Plus
Mini Docking Station

Notebook Upgrades!

- Additional 8MB \$379
- Additional 16MB \$769
- Hard Drive - 810MB to 1.0GB Call
- NiMH Battery Pack \$75
- Second NiMH Battery Kit \$110
- Battery Recharger \$49
- Adaptec AirPort 2000 \$99
- Deluxe Carrying Case \$69
- PCMCIA 14.4Kbps Fax/Modem \$195
- Extended Service Plans Call
- Mini Docking Station \$179**
 - 1 Serial, 1 Parallel, Keyboard,
 - Mouse and VGA Port Replication
 - Microphone In, Speaker Out
 - MIDI, Joystick Port
 - Two Stereo Speakers
- Main Docking Station \$700**
 - All Features of Mini-Docking Station Plus:
 - 5.25" Drive Bay
 - Internal CD-Audio Interface
 - 1 Full, 1 Half Size PCI Slot

Desktop Upgrades!

- Additional 16MB \$560
- Hard Drive - 1.6GB to 2.0GB \$109
- Monitor - 15" to 17" .28 Flat Screen \$299
- Fax/Modem - 14.4Kbps Internal \$69
- Fax/Modem - 28.8Kbps Internal \$149
- Fax/Modem - 28.8Kbps Internal w/ Voice \$169
- Multimedia Package \$140**
 - Creative Labs Vibre 16™ 16-bit Stereo SoundBlaster™ Compatible Sound Card
 - Amplified, Shielded Stereo Speakers
 - Microsoft® Encarta™ and 8 CD-ROM Titles

Pentium® Pro Based Systems

New Intel Pentium® Pro based systems—call Swan for product information.

SWAN
TECHNOLOGIES
25 YEARS

800-554-6741 96PCMG

Federal Customers Call: 800-382-4919 • GSA# GS-35-4270D • www.swantech.com

Specifications and prices subject to change without notice. All marks are property of their respective organizations. *Overnight delivery available on Swan Express orders. On-site service may not be available in some remote locations. Call for details of warranty and service agreements. †Upgrade prices valid at time of system purchase. (Ad by MoonBeam Graphics, Marlborough, MA)

CIRCLE 053 ON READER SERVICE CARD

SWAN
TECHNOLOGIES
corporation





By Jeff Prosis

Researching With the Web

How to find exactly what you're looking for on the Internet—lickety-split.

Like the Energizer bunny, the World Wide Web just keeps going and going. Nobody knows exactly how many pages there are on the Web, but the latest estimates peg the count at somewhere in the neighborhood of 20 million pages containing more than 10 billion words of text. The Web is an immense repository of information, but how do you know where to go to gather data on corn farming in Iowa or to find pictures of humpback whales? Searching the Web for information on a particular subject by randomly surfing can waste a lot of time.

If you're a newcomer to the Web, you'll be pleased to know that several companies have taken it upon themselves to build huge databases of information gathered from the Web. Given a search key such as the phrase *humpback whale*, these databases take a matter of seconds to return the URLs (uniform resource locators) of all (or nearly all) Web pages known to contain the search key. Access to the databases is gained through "search sites" on the Web itself. For example, <http://www.yahoo.com> is the URL of Yahoo!, one of the most popular search sites on the Web. Just go there with your browser and you'll see a simple form that you can fill out to initiate a search. When the search is complete, you'll be presented with a page containing descriptions of and links to all the sites that produced "hits" during the search.

How much does it cost to use a search site? That's the best part. Access to most search sites is free, because the companies that support them make their money by selling advertising space on their Web pages.

Most search sites use automated programs variously known as *web crawlers*, *spiders*, and *robots* to scour the Web continually and keep their databases up to date. Certain databases are far more extensive than others, and different sites offer varying levels of search capabilities. For example, at most sites you can use

Boolean operators such as AND, OR, and NOT to narrow the scope of a query. A few sites support "fuzzy" searches to account for mistaken or unusual spellings. And some sites index Usenet newsgroups and other parts of the Internet in addition to the Web. All in all, there's something out there for everyone and something to help track down almost any kind of information you desire.

To help you conduct research on the Web, I've compiled short descriptions of some of my favorite free search sites. I also conducted an unscientific test at each site by per-

YAHOO!

Yahoo! is considered the granddaddy of Web search sites, because it is generally accredited with being the first one to come online. It's also one of the most commercially successful; according to one news magazine, Yahoo! generated more than \$1 million in advertising revenues in 1995. *PC Magazine's* owner, Ziff-Davis Publishing Co., recently joined forces with Yahoo! to publish a magazine called *Yahoo! Internet Life*.

Yahoo! is usually the first place I go when I do research on the Web, because its database is extensive, but not so extensive that a simple search turns up more URLs than one can possibly visit. Searching on *Cozumel*, for example, turned up nine Web pages. The same search turned up hundreds of matches at some of the competing search sites.

Yahoo! offers a simple set of search options that provide some versatility in the types of

searches performed yet aren't likely to overwhelm a new user (see Figure 1). You can search on single words or you can type in multiple words and click a button to tell the search engine whether to find pages that contain *all* the words (the equivalent of using a Boolean AND) or *any* of the words (a Boolean OR). You can also specify whether the search should include pages with words matching the search keys or words that *include* the search keys. When the latter option is selected, a search for *land* will turn up Web pages containing the word *land* as well as Disneyland, Greenland, and other supersets of *land* that are completely irrelevant, like glandular and clandestine.

Yahoo! also offers a hierarchical list of Web sites sorted by category. Click on Education, for example, and a second list appears containing subcategories such as Adult Education, College Entrance, and Courses. Work your way downward through the hierarchy and eventually you'll

find links to Web sites containing information on very specific subjects. You can also pause at any point and perform searches targeted to the category or subcategory you're in.

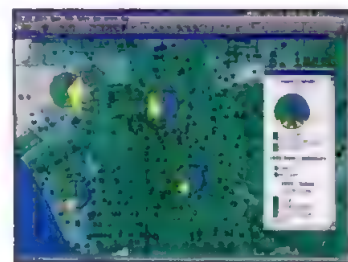
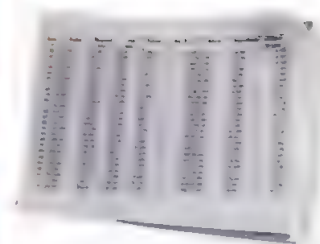
LYCOS

Another popular Web site frequented by those in search of information, Lycos (<http://www.lycos.com>) claims to have in-



FIGURE 1: The Yahoo! home page at <http://www.yahoo.com>.

forming a search on the word *Cozumel* as part of research I'm conducting for a dive trip I'm planning. Generally speaking, more hits indicate a more extensive database. Keep in mind, however, that more is not always better. It's a lot easier to visit 10 Web pages than it is to visit 100. And if 90 of the sites are irrelevant, you've wasted a lot of time unnecessarily.



STACK THE DECK IN YOUR FAVOR.

1-800-327-8627



What if you knew crucial information ahead of your competition? What if you could literally see all the intertwined functions of your business inside a single picture? Imagine having that kind of power every hour of every day.

You can. In fact, thousands of companies successfully use it every day. It's MapInfo® desktop mapping. And it's changing the way business is being done.

How? With the help of a map. It can bring together all different kinds of data. Transforming those boring rows and columns into obvious, actionable answers. Go ahead and ask even the toughest business questions. Our desktop mapping applications can instantly reveal hidden relationships and patterns, bring new opportunities into focus, and help you see things you couldn't see before. Things your competition still can't see.

That's the power. The power of holding all the cards. You'll be making crucial decisions on issues other companies haven't even begun to think about. And without question, you'll have one heck of an unfair advantage.

Call for our free demo disk. Or visit us on the Web at <http://www.mapinfo.com>. After all, you've got every reason to want to stack the deck in your favor.

With MapInfo, boring data becomes exciting maps that provide a powerful picture of your business. Analyze your business with an affordable MapInfo solution that's just right for you.

 **MapInfo**
is desktop mapping

Picked Sales 1-800-619-2333. Outside US 1-518-285-6000. MapInfo runs on Windows,™ Macintosh,™ Power Macintosh,™ Sun™ and HP™. MapInfo and the MapInfo logo are registered trademarks of MapInfo Corporation. All other marks, trademarks and registered trademarks are the property of their respective holders.

CIRCLE 344 ON READER SERVICE CARD



THE MOST POWERFUL NOTEBOOK.
THE FASTEST PROCESSOR.
THE NEWEST SOFTWARE.



NOT ENOUGH MEMORY.

Now that you have that powerful new system, the possibilities are endless.

Unfortunately, your memory isn't.

That's where Apricorn comes in.

Because for over 12 years, we've been making the world's highest quality notebook and laptop memory. Which means you'll always get the best products, the most advanced technology and the right configurations. All with an unconditional lifetime warranty. And prices low enough to let you really stock up.

So just call 1-800-458-5448, and you'll never have to think about memory again.

There, don't you feel better already?



APRICORN

The Notebook Memory Experts

© 1996 Apricorn, Inc. Corporate Address: 10670 Travena Street, San Diego, CA 92131.

TOSHIBA
NOTEWORTHY
AUTHORIZED
SUPPLIER



Ready for
OS2 WARP



CIRCLE 020 ON READER SERVICE CARD.

dexed more than 90 percent of the Web. A search on *Cozumel* turned up a list of 453 Web pages. Besides providing a comprehensive indexed reference to the World Wide Web, Lycos indexes Gopher, FTP, and HTTP files found elsewhere on the Internet. It also includes an extensive directory of about 40,000 of the most popular sites on the Web and reviews of more than 7,000 of them.

Lycos is among the fastest and most flexible search engines available on the Web. To help you deal with the staggering number of URLs it often returns in response to a simple query, Lycos uses a proprietary algorithm to estimate the relevance of each document it finds. A keyword appearing in a document title, for example, will produce a higher relevance rating than a keyword appearing in the body of the document. Documents with higher ratings appear first, and you can adjust the search sensitivity to weed out documents with lower relevance ratings. This reduces the number of hits reported and theoretically does so without reducing the value of the information returned. If speed and thoroughness are among your key criteria for selecting a search site, Lycos is definitely one of the sites you'll want to consider.

ALTA VISTA

Arguably the most comprehensive index of documents on the Web, Digital Equipment Corp.'s Alta Vista (<http://altavista.digital.com>) is thorough to a fault: Unless you're very specific about your search criteria, it often turns up so many matches that you can't possibly investigate them all. My search on *Cozumel* turned up "about 1,000" hits—so many that Alta Vista reported an approximate number rather than an exact one.

Alta Vista has been online only since December, but already it is one of the most popular sites on the Web, logging several million HTTP requests every day. It claims to have indexed more than 11 billion words on 22 million Web pages, and it includes a full-text index of more 13,000 newsgroups. It's fast; the machine that does the indexing and handles queries from the Web server is a ten-processor AlphaStation with a 210GB RAID hard disk and—get this—6GB of RAM. The spider that crawls the Web and feeds pages to the indexer is no slouch, either. It runs on a DEC 3000 with a 30GB hard disk and 1GB of memory. According to the folks at Alta Vista, the spider is the fastest in existence and fetches pages at a rate of 2.5 million per day. That means the Alta Vista database can be updated every few days, which reduces the likelihood that a search will turn up a page that no longer exists or miss one that has just come online.

Alta Vista's query language supports Boolean AND, OR, and NOT operators, as well as NEAR operators for proximity searches. NEAR specifies that two words must appear

within ten words of each other in a document. For example, searching for *Edward Murrow* will miss references to Edward R. Murrow, but searching for *Edward NEAR Murrow* will not.

Alta Vista's query language also includes keywords for restricting searches to certain parts of a document—to document titles and to embedded links to other Web sites, for example. Ever wonder how many other pages on the Web contain links to your own Web site? You can find out with Alta Vista. Just enter the following search text on the Simple Query page:

```
+link:http://www.mysite.com -url:
➔http://www.mysite.com
```

Be sure to substitute your own URL for *www.mysite.com*. Links to your site from your site will be excluded, so you'll get a realistic count of the number of external links to your Web page.

EXCITE

Another search site I find myself stopping at frequently is Excite (<http://www.excite.com>). Though not as comprehensive as Lycos and Alta Vista—Excite claims to have indexed more than 1.5 million Web pages, and it turned up 30 pages containing the word *Cozumel*—Excite offers a compelling feature that few other search sites can boast: the ability to search by content rather than keyword. A search on *scuba diving*, for example, might turn up information on dive spots contained within Web pages that don't specifically include the words *scuba diving*.

Excite also includes searchable reviews of more than 50,000 Web sites, indexes for more than 1 million articles from about 10,000 newsgroups, and a fully searchable copy of the last two weeks' worth of classified ads from Usenet.

My primary complaint about Excite is that searches tend to be several times slower than searches performed on other premiere search sites. I'm unsure whether this is because of the demand placed on the site by concurrent users, an inferior search engine, or simply an underpowered server, but the speed difference is noticeable. Once you've gotten used to the speed of Lycos and Alta Vista, it's hard to settle for anything less.

WEBCRAWLER

WebCrawler (<http://www.webcrawler.com>), which is managed by America Online but accessible to anyone on the Web, isn't the fanciest search site around, but it is one of the cutest. A cartoonlike spider in the logo makes WebCrawler's home page attractive to children, and the interface to the search engine is simple enough probably for second and third graders to use. WebCrawler's database isn't as

extensive as some of the others mentioned in this article, but it's useful nonetheless and managed to turn up 148 pages containing the word *Cozumel*. The site also includes interesting facts about how WebCrawler was started and how it works—perfect for someone who'd like to learn more about spiders and other denizens of the Web.

OTHER TIPS

If you're a one-stop shopper, place a bookmark on Netscape's Internet Search page, found at http://www.netscape.com/escapes/internet_search.html. There you'll find an up-to-date list of the dozen or so most popular search sites and hypertext links to get you to the sites themselves.

There is a separate class of Web search sites that delegate their work to other sites; some will let you search several online indexes at once. For example, Net Locator (<http://nl.com>) performs searches using Alta Vista, Lycos, or any one of a number of other popular Web databases. If you tend to use several search sites to do your research rather than just one, Net Locator can serve as a standard interface to all of them. A relatively new search site, All4one (<http://easypage.com/all4one>), will take one query and execute it on four search sites simultaneously—Yahoo!, Lycos, Alta Vista, and WebCrawler—so you can be virtually certain of not missing a Web page that's relevant to the subject you're researching.

The ultimate in Web search tools is Quarterdeck's WebCompass. Like Net Locator and All4one, WebCompass performs searches by submitting queries to existing search sites. But it also does much more. For example, it will retrieve documents identified in a search and build a local database for you containing summaries of those documents. Much of the work is performed by an "agent" that runs in the background and uses its own algorithms and heuristic rules to analyze each document's content, generate abstracts, and group documents together. WebCompass is not a Web site; it's a separate software product that works in conjunction with existing Web browsers. For more information (and to download a free "trialware" version of WebCompass Personal Edition), point your browser to <http://www.quarterdeck.com>.

Next time you have research to do, try out some of the pages mentioned in this article and see if they don't make your job easier. The Web isn't everything—it's no replacement for a good encyclopedia or a comprehensive media archive, for example—but for locating any kind of information that might appear on somebody's Web page, it's perfect. And you can't beat the price. □

Jeff Proise is a contributing editor of PC Magazine.

Built-in JBL® speakers
deliver incredible sound.

Sleek, stylish and
just 16 pounds.

Auto-sensing software
adjusts the picture for you.

Control your PC
or Mac® with our new
Smart Remote.

Active-matrix LCD
and a bright 270-watt
metal-halide lamp.

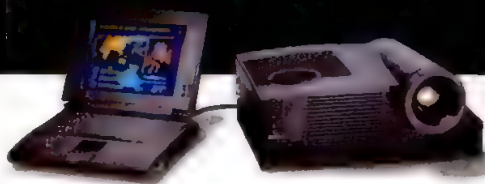
(And the price will blow you away.)

Imagine one of these on your conference room table. A new LitePro® 210 multimedia projector. Out of one end blasts bright, colorful video and computer graphics. Out of the other end (and the top) you get rich, room-filling sound powered by JBL® speakers

We even packed in things that make it easier. Like software that adjusts the picture for you. And our exclusive CableWizard™ that slashes the wire jungle down to just one cord.

Yet there's one thing we left off—a hefty price tag. Our new projectors are modular. So you only pay for what you need. And you can upgrade later. It's innovations like these that have made us the world leader. And projectors like this that'll blow you away.

YOU'RE STARING DOWN
the barrel of a
**FULLY-LOADED
PROJECTOR.**



InFocus®
SYSTEMS

Take a test drive: 1-800-294-6400
or <http://www.infs.com>

"TriSpectives...deserves the killer-app label!"

Stanford Diehl, BYTE Magazine, October 1995

Designed for

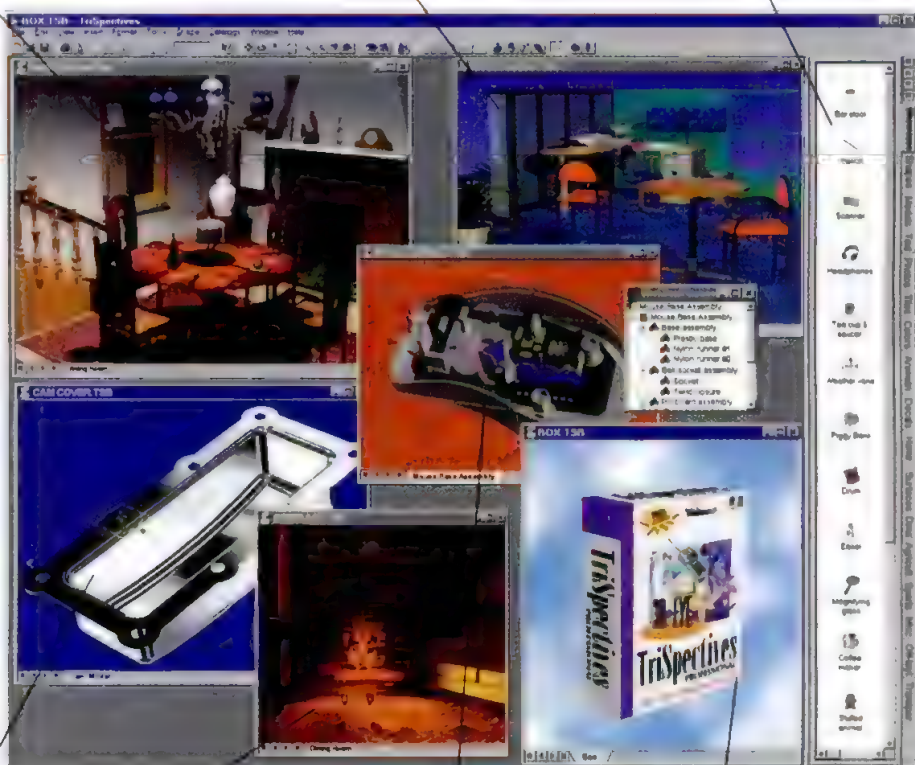


Microsoft®
Windows® 95

Microsoft®



OFFICE
Compatible





Architectural renderings

Office layouts

FREE! Over 1,000 3D models!

Detailed part design

Virtual worlds for the Internet

Complete assembly modeling

Professional illustrations - in 3D!

TriSpectives™

PROFESSIONAL

The New Standard for 3D



Visit us on the Internet at <http://www.eyeye.com>

"The next killer app in the graphics market!"

Malcolm Davies, President, Nemetschek Systems, Inc.

TriSpectives™ Professional — the New Standard for 3D — is the first complete 3D design program for Windows® 95. By combining **unprecedented 3D modeling, illustration and animation** features, TriSpectives is the ideal solution for all your 3D design needs.

Use TriSpectives Professional to:

- Quickly create 3D conceptual models of new designs.
- Develop detailed parametric 3D models and assemblies to full manufacturing specifications.
- Design realistic floor plans.
- Create amazing virtual worlds for the Internet.

With TriSpectives you'll design faster, you'll use 3D for more than you can imagine, and you'll have fun doing it!

INCLUDES:

- Import/export filters for 3DS, AVI, BMP, DFF, DWG, DXF, EPS, GIF, IGES, JPEG, OBJ, PCX, POV, RAW, RTL, SAT, STEP, STL (Stereolithography), TGA, TIFF, Visual Basic, & VRML
- 1,000 IntelliShape™ 3D models
- 250 scaleable textures, colors and surface finishes
- 50 document templates

ACIS
FOR EXCELLENCE

→ Contact your local
retailer for low pricing, or
order direct from 3D/EYE for:

\$549.95*

1-800-WIN95-3D
or 716-871-5041 Ext. 8510

60-Day Money-Back Guarantee!

COMPUTER
1-800-THE-CITY

CITY

EGGHEAD
All you need to know.
1-800-EGGHEAD

COMPUTER
WORLD
1-800-221-6180

PC Connection
1-800-800-1113

Stream
1-800-SOFTWARE

*US\$ plus applicable taxes and shipping. Additional charges may apply for international customers.

© 1995 3D/EYE, Inc. TriSpectives, IntelliShape, SmartMotion, SmartDimensions, SmartSnap and SmartRender are trademarks and 3D/EYE is a registered trademark of 3D/EYE, Inc. ACIS® is a registered trademark of SPATIAL TECHNOLOGY INC. Windows is a registered trademark of Microsoft Corporation. All other product, brand or company names are registered trademarks or trademarks of their respective holders. TS-1013-2609

CIRCLE 032 ON READER SERVICE CARD

NEW DESIGNCAD 3D

VERSION 8 for Windows 3.1 or Windows 95

Share your designs with other programs using the Windows clipboard, OLE-2, and file compatibility with DWG, DXF, IGES, BMP, WMF, and other file formats.

Produce professional results with smooth shading and 3D animation.

Introductory offer

Only \$299!

Normally \$499⁰⁰

More than 30 realistic materials are included to make your designs come to life with the look of brass, wood, marble, and more!

- New DWG file compatibility for AutoCAD file transfer.
- Full Windows 95 Support
- True 3D CAD with Solid Modeling
- Realistic Shading
- 3-D Animation
- Free Technical Support

Easily label your designs with 3D dimensions and 3D text.

Use solid modeling features such as the subtraction of one solid from another and interference checking.

More than 500 2D symbols and 250 3D symbols included free!

DesignCAD 3D for Windows 95 fully supports long file names, Microsoft Mail, drag and drop, and full 32-bit support.

DesignCAD is easy to customize with the Microsoft Visual Basic interface, macros and customizable menus and toolbars.

The 2D drawing mode allows easy designing of floor plans and shop drawings.



DesignCAD Office 95 (also available for Windows 3.1)

The complete CAD solution. Eight great programs individually would cost over \$1,900. Your price for DesignCAD Office is only \$995.

DesignCAD 3D for Windows 95

DesignCAD 2D for Windows 95 - Powerful, easy-to-use drafting package.

DesignCAD 3D Symbol Library - 700+ symbols in true 3D!

DesignCAD 2D Symbol Library - 7000+ architectural and industrial symbols.

ScanPRO - Convert Scanned images into DesignCAD.

Instant Estimator - Automatically calculate costs of a project.

Instructional Videos - Video tutorials for DesignCAD 2D and 3D.



\$995
Competitive
Upgrade \$595

Call, Mail, or Fax your order to:

ViaGrafix

One American Way,
Pryor, OK 74361

800/233-3223

918/825-7555

fax 918/825-6359

www.ViaGrafix.com



YOU'VE ALWAYS WANTED AN OFFICE AS BIG AS A CONFERENCE ROOM.

Not everyone can have an office the size of a conference room, but now, with ConferenceLink™ CS1000 from U.S. Robotics, your office can at least perform like one.

ConferenceLink is one of the most advanced conference speakerphones available today. And, at around \$400, it's not just for conference rooms anymore.

It features SimulCom™ full duplex speakerphone technology, which means you can hear everything even while you're talking.

And, thanks to the phone's three built-in microphones and powerful speaker that operate simultaneously, your conference calls can be as natural as if you were all in the same room.

ConferenceLink also utilizes automatic gain control, so that no matter where you sit, or how many people you have packed into your office, every word is heard crystal clear.

To hear the difference for yourself call U.S. Robotics at 1-800-949-6757 for a demonstration and a dealer near you.

A Performance™ Telephone For Around \$400.

U.S. Robotics
The Intelligent Choice in Information Access

The U.S. Robotics ConferenceLink CS1000 is now available at all Office Depot®, Elek Tek® and other stores near you.

Worlds collide.
Dogs bark. Spoons
melt. And 32-bit
Crosstalk with
Netscape Navigator
is only \$69.



Introducing Crosstalk® inter.comm Suite. Now, for just \$69 you can trade up to the world's most award-winning comm package — the only package that includes the latest Netscape Navigator,® version 2.0. But, please be careful wielding your power.

You'll flex every information access feature known to man — including full Internet e-mail, FTP, and Telnet support. For less than what you might pay for a browser alone, connect right out of the box to host computers, the Internet, CompuServe,® Dow Jones, and more. Plus, only Crosstalk inter.comm Suite gives you a CD with both 32-bit and 16-bit software, for blazing performance on any PC.

So bring your worlds together. For a limited time, trade in any old comm or Internet software and get Crosstalk inter.comm Suite for \$69 — \$110 off the retail price! All with a 60-day, money-back guarantee. Call 800-426-6283 and mention response code 36.25. For instant info, direct your old browser to <http://www.attachmate.com>.



Crosstalk inter.comm Suite

© 1996 Attachmate Corporation
All rights reserved. Attachmate and Crosstalk are registered trademarks of Attachmate Corporation. All other trademarks or registered trademarks are the property of their respective owners.



Attachmate



PC Tech/Power Programming

By Paul Bonner

Reuse Toolbars in Visual Basic

This Visual Basic 4.0 add-in lets you save toolbars for later use.

Times change, and expectations increase. Visual Basic long ago earned a reputation for simplifying the user-interface design process, but judging by more contemporary standards, that reputation may now be in jeopardy.

It is no longer enough for a development environment to offer dragging and positioning of user-interface controls and a fill-in-the-blanks menu editor. A state-of-the-art development tool should also help developers reuse their work and employ consistent interface designs throughout and across applications. Borland's Delphi 2.0, for instance, includes an object repository that acts as a library for commonly used application templates, data dictionaries, dialog boxes, forms, and other objects. A Delphi programmer who sets out to create a new object can base that object on any object in the repository, with the option of having the new object copy or inherit all the attributes, properties, and methods of the repository object.

Visual Basic, on the other hand, still fails in its fourth release to provide any mechanism for reusing existing code or forms. While Microsoft vaunts the consistent design of dialog boxes, menus, toolbars, and other elements throughout its Office application suite, Visual Basic continues to be based on the presumption that design standards and consistency aren't even an issue. Every time you create a form in Visual Basic, you start with a blank slate, gaining no benefit from having already created other forms whose control layouts, event procedures, menus, and toolbars would all work nicely in your new form.

A CLUELESS TOOLBAR

Visual Basic's lack of support for reusing existing designs is particularly vexing when it comes to the new Windows 95 common controls. The new user interface elements provided by Windows 95 (including Explorer-like ListView and TreeView controls, a Rich Text Box, Statusbar and Toolbar controls,

and an ImageList control that stores bitmaps for use by other controls) provide efficient building blocks for assembling attractive and modern user interfaces. But their programming interfaces often seem needlessly complex, a problem that Visual Basic does nothing to alleviate.

For instance, consider the Windows 95 Toolbar control. The standard way to use this control is to add COMCTL32.OCX to your project, then drag both a Toolbar control and an ImageList control onto a form. Next, you add a series of images (in the form of .BMP or .ICO files) to the ImageList control through its Properties dialog, then use the Toolbar control's property dialog to identify the ImageList control as the source for the Toolbar bitmaps and define

ers could have made life a lot easier for Visual Basic 4.0 programmers—particularly since you will probably be repeating this process quite frequently. Having managed to cobble together a toolbar despite these limitations, you probably won't be thrilled to find out that there is no way to save it for reuse in a future project.

Being unable to save dialog boxes or forms is bad enough, but nonreusable toolbars are ridiculous. Toolbars cry out for reusability. Forget for a second how tedious toolbars are to create; think instead about the poor end user. A toolbar is truly effective as a user-interface device only when the user is familiar with its layout and comfortable with its appearance and operation. The standardization of toolbars across applications

suites like Microsoft Office and Lotus SmartSuite is a significant aid to their usability; the differences between the toolbars of competing suites is a significant barrier to moving from one suite to another.

It therefore strikes me as inconceivable that Visual Basic doesn't offer a facility for loading and saving toolbar templates and instead forces you to create each toolbar from scratch: laying out buttons on the toolbar control, selecting images for the ImageList control, and writing handler code for all your toolbar events. What it *ought* to do is let you save complete toolbars (including the Toolbar control, ImageList control, and all the Toolbar's event-hand-

ler code) and then load them whenever you want onto other forms. (To be fair, I haven't seen any development tools that *do* offer this capability, but that doesn't mean that they shouldn't.)

ADD-INS TO THE RESCUE?

The one saving grace of all this is that, unlike previous versions, Visual Basic 4.0 provides a mechanism for overcoming some of the shortcomings of its design environment via an add-in interface. The add-in API enables Visual Basic developers to create utilities that inter-

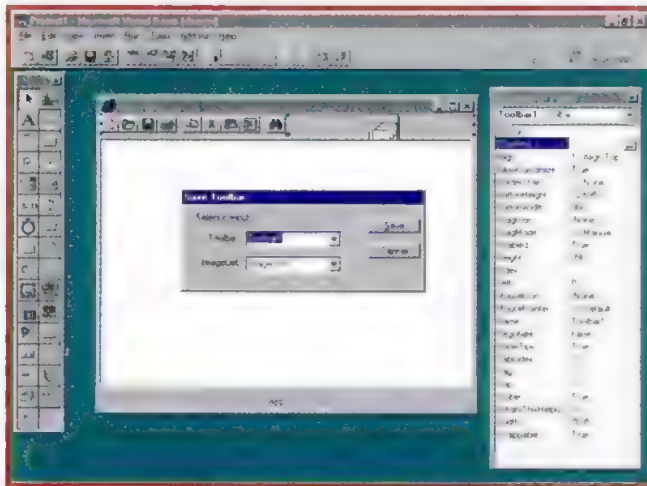


FIGURE 1: *Toolbar Wizard's Save Toolbar dialog box lets you specify the toolbar you want to save.*

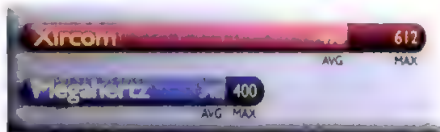
the location and appearance of each toolbar button, including the ImageList image that is to display.

This process is complicated by several annoying limitations in the ImageList and Toolbar controls, such as the ImageList control's inability to reorder its contents and the Toolbar control's inability to preview the contents of the ImageList control (forcing you to select button images using either an index number or a text tag instead of the actual image). Clearly, a little more effort here on the part of COMCTL32.OCX's design-

**YOU CAN'T
BUY A FASTER
ETHERNET+
MODEM CARD
FOR YOUR
NOTEBOOK.**



1. "Faster means faster. Really faster. Not just marketing-speak faster. Take a look at the chart on your right. Thanks to advanced



Source: Perform3. Throughput measured in Kbps. Longer is better.

look-ahead pipelining and full duplex data transfer, the Xircom CreditCard Ethernet+Modem delivers 40%



better performance on an Ethernet LAN than any other PC card."

5. "The new network drivers on the CreditCard Ethernet+Modem 28.8 are compatible with the best-selling Xircom Performance Series CreditCard Ethernet Adapter 11ps. So you can have one set of network drivers for all of your Xircom mobile users."

6. "The Xircom CreditCard Ethernet+Modem 28.8 is fully SNMP manageable. Which means you can use

9. "Xircom pioneered notebook networking. They really understand the needs and lifestyle of the mobile user. Look around. Xircom users outnumber all others by five to one."

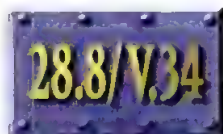
10. "Xircom also makes a blistering fast CreditCard 28.8 modem. The fastest modem money can buy.



Plus you get the same Xircom quality. The same Xircom support. And the same Xircom

NOW, HERE'S WHAT YOU TELL THE GUYS IN MIS.

2. "Faster by LAN. Faster by phone line, too. The Xircom CreditCard Ethernet+Modem 28.8 features a V.34



modem that's double the speed of its 14.4 predecessor."

3. "The best just keeps getting better. This is the third-generation CreditCard Ethernet+Modem from Xircom. It's field-proven technology that's won universal acclaim and virtually every major industry award."



4. "It's easy to set up. The Xircom CreditCard Ethernet+Modem 28.8 comes with its own Windows-based easy-installation software (an enhanced Version 2.0 no less). It also comes with Delrina's data and fax software."

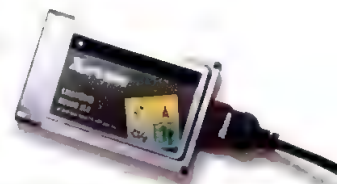
your standard network management tools (like HP OpenView) to manage and monitor your notebook users while they're on your LAN."

7. "Along with the CreditCard Ethernet+Modem 28.8 comes the Xircom Customer Assurance Pledge. So we'll be able to trade-up the CreditCard Ethernet+Modem 28.8 for newer, faster technology in the future and receive a full 35% discount directly from Xircom."



8. "It comes with a lifetime warranty. It comes with a 30-day money-back guarantee. It comes with free customer support. It even comes with next-day replacement parts. And you can always get in touch with Xircom day or night via their Electronic Bulletin Board or FactsLine or CompuServe"

standards of technical excellence."



11. "If you don't believe me, talk to the folks at Xircom yourself. Give them a call at 1-800-438-4526 ext. 52B or visit them on the World Wide Web at Road Warrior Central: <http://www.xircom.com>."

12. "I really, really want a Xircom CreditCard Ethernet+Modem 28.8 card for my notebook. It's a really good buy. It's a safe buy. It's a responsible buy. If you sign off on it, I won't bug you for anything else again. For two weeks, okay a month. How 'bout a month? I promise."

Xircom

The Mobile Networking Experts.



act with the Visual Basic 4.0 development environment. These can add entries to the Add-Ins menu, manipulate forms and controls in the active project, and respond to file events such as the loading or saving of a form file.

The add-in interface seemed like the ideal vehicle for overcoming the deficiencies of Visual Basic's implementation of the toolbar,

groups (such as the methods used to add References and Typelibs to a project) are not used in any of the example projects.

Worse than the holes in documentation, however, are the holes in the API—by that, I mean the nearly endless list of things that you cannot do through the add-in interface. Some but by no means all of these are described in a

Microsoft Knowledge Base article (#Q141931) entitled "Limitations of the Visual Basic 4.0 Add-In Object Model." The article begins by warning that "only a portion of the development environment is exposed to add-ins, and therefore, some functionality that you may want could be missing." Change that "could" to "almost certainly will" and you have a pretty accurate picture of what awaits any would-be add-in developer.

Among other limitations, an add-in can only work with the active form; cannot activate an-

other form or module; cannot set Datasource or Picture object properties; cannot access the Visual Basic development-environment toolbar, menus, Code, Debug, Menubar, Project, Properties, or Toolbox windows, or the Properties window of any control. Nor can it determine what mode (run, break, or debug mode) the development environment is in. And those are just the biggies that jump right out at you. Other "limitations" pop up regularly as you work with the add-in API.

When you click the dialog box's Save button, Toolbar Wizard presents a standard Save As dialog in which you can enter a name for the new toolbar (.TBR) file. It then proceeds to save all properties of the selected Toolbar and its associated ImageList to the specified file, along with the event-handler code for all nine toolbar-related events (ButtonClick, Change, Click, DblClick, DragDrop, DragOver, MouseDown, MouseMove, MouseUp).

Loading a toolbar reverses that process. The Load Toolbar dialog box uses a pair of text edit boxes to allow you to name the Toolbar and ImageList controls that will be added to your form (tbwizTB1 and tbwizIL1 are the default names). When you click the Open button, Toolbar Wizard displays a standard Open dialog through which you can select the .TBR file you wish to use. It then adds the Toolbar and ImageList controls defined therein to the active form in your current project (using the names you specified), along with all the saved toolbar's event-handler code.

That's Toolbar Wizard in a nutshell. Doesn't sound all that complicated, does it? But it took a lot of doing to make it that simple.

INSIDE THE TOOLBAR WIZARD

There are two stages to writing any Visual Basic 4.0 add-in application. The first is setting up the structures your add-in will need to handle such chores as registering itself with Visual Basic's Add-In Manager, adding custom menu items to the Add-In menu, and identifying the methods that will be called in response to menu events or file events. This stage is quite similar from project to project (in fact, generating add-in boilerplate code to handle these tasks would be a good job for an add-in).

Toolbar Wizard utilizes a pair of class modules (CONNECT.CLS and TBMENUITEM.CLS), along with a standard code module (MAIN.BAS) to handle these housekeeping and interface functions. The ConnectClass object defined in the first class module exposes the two public methods: ConnectAddIn

```
Private Function CheckForDirt() As Boolean
Dim CurrFormName$, i%
With gobjIDEAppInst.ActiveProject
CurrFormName$ = .ActiveForm.Properties.Item("Name")
With .Components
For i% = 0 To .Count - 1
If .Item(i%).Name = CurrFormName$ Then
If .Item(i%).IsDirty Then
CheckForDirt = True
Beep
Load SavePrmpt
Exit Function
End If
End If
Next
End With
End With
End Function
```



FIGURE 2: The CheckForDirt function returns a Boolean value indicating whether or not the active form has unsaved changes.

and indeed I was ultimately able to use it to build a Toolbar Wizard add-in. But the process of doing so was anything but smooth. I ran into numerous functional gaps in the add-in interface, as well as other pitfalls.

That isn't to say that I'm not happy with the result. My Toolbar Wizard succeeds in overcoming the worst problem with toolbars in Visual Basic 4.0, allowing you to save a toolbar to a disk and load it later, complete with its accompanying ImageList and all of its event code, onto another form. But I was surprised at how difficult it was to achieve that result, and at how many seemingly obvious needs *can't* be fulfilled through the add-in interface.

Much of that difficulty could be attributed to the general lack of documentation for the add-in interface. There is no discussion whatsoever of the add-in API in Visual Basic 4.0's printed documentation, and the online Help file documentation for it (which is duplicated verbatim in the Visual Basic Books Online guide) is quite sparse. The Help file presents reference descriptions of the various objects and methods that make up the add-in interface, but there is no example code to accompany those descriptions and no real overview of how one should approach the add-in API. There are three example add-in projects on the Visual Basic disk, but again, those are undocumented except for occasional inline comments. Moreover, the three example projects are anything but comprehensive in their use of the add-in API; in fact, some key function

groups (such as the methods used to add References and Typelibs to a project) are not used in any of the example projects.

As I became aware of these limitations, I scaled back the plans for my Toolbar Wizard add-in. Originally, I intended to create a comprehensive toolbar construction set—one that would enable you to perform all the tasks necessary to create a toolbar, including populating the ImageList and laying out toolbar buttons, through a single series of linked dialog boxes, as well as allowing you to load and save toolbar designs. But given the hurdles inherent in the add-in API, it seemed prudent to concentrate on the core task of providing a way to reuse toolbars.

THE TOOLBAR WIZARD

The scaled back utility starts by adding a new menu item with the caption Toolbar Wizard to the Add-Ins menu. Two cascading sub-items appear beneath that: Save current toolbar... and Load toolbar...

When you select either subitem, Toolbar Wizard determines whether changes have been made to the active form since it was last

"If you run Windows 95, you'll fly with MouseMan 96."

B. Featherstone
Aviation Designer

Gain fast access
to full menus.

Minimize open windows.

Close open
windows.

Scroll vertically.

Move quickly and
easily between windows.

One click of the middle
button and you'll
access all this!

Activate the
start button.

Scroll horizontally.

Resize open
windows.

Introducing Revolutionary New HyperJump Technology

MouseMan[®] 96 by Logitech is the only mouse optimized for Windows[®] 95. It's everything you'd expect from the world's leading mouse maker, and more! MouseMan 96 includes the revolutionary HyperJump[™] technology - which allows you to access eight important Windows 95 commands with a single click of the middle button. And you still get superb Logitech design, Plug and Play installation, and three button programmability. For information, or the dealer nearest you, call 1-800-732-3041, or for information by fax call 1-800-245-0000, Document 4030.

Visit Logitech and MouseMan 96 at <http://www.logitech.com>

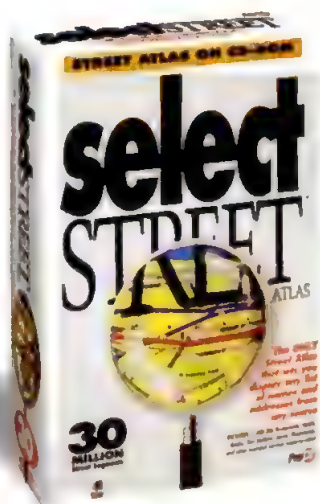
HyperJump feature enlarged to show detail. [™] and [®] trademarks are the property of their respective owners.



Products
people love

Plot and display your customer and prospects down to street-level detail.

The easy way to locate



SUPER ACCURACY.

Want to see where your customers are clustered? Need detailed street maps to route your delivery people? Looking for restaurants near the convention center? How about a full

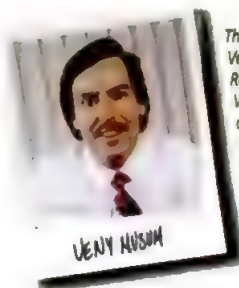
color map for your brochure? No problem. Select Street Atlas can do all this and more. Look how these business owners use Select Street every day to locate more business opportunities.



1 Carving up the territory

Use *Select Street Atlas* to divide territories so your sales people can efficiently cover your market. Meet Veny Musum. Veny is Senior Vice President for John Paul Mitchell Systems, distributor of the top-selling Paul Mitchell line of hair care products. You'll find them in many of the 45,000 independent hair salons in his Northeast territory. But they just don't get there by accident. First, Veny searches for beauty salons by

business heading and ZIP codes in *Select Phone*, the #1-selling Phonebook on CD-ROM. Then he exports the list to *Select Street Atlas*, which automatically plots and displays these salons as close as a stunning ten feet of their actual locations. From there it's a few easy clicks to divide up the territory for his sales force. "We use *Select Street Atlas* and *Select Phone* to locate new accounts and route our salespeople. It's simply amazing."



This is Veny Musum, Regional Vice-President of John Paul Mitchell Systems.

2 Street level maps in amazing detail

Print out highly detailed, full-color maps for account reps, delivery people, customers and prospects. Richard Ross is General Manager of Evergreen Tropical Interiors, Inc. Every day, 365 days a year,



This is Richard Ross, General Manager of Evergreen Tropical Interiors, Inc.

thousands of living things rely on Evergreen's technicians for their food and water. That's because Evergreen designs, installs and maintains indoor landscapes for hundreds of clients. Like a doctor's medical records, each site requires a file to track and monitor plant health. And one important component of the file? A street-level map detailing where the client site is located. So when technicians pick up their daily rounds, there's never any problems finding the patients. Says Richard, "Everyone should use *Select Street* for routing deliveries – the time savings are simply incredible."

3 1,000,000 ready-to-view listings

From hotels and restaurants to banks and schools, *Select Street* gives you 20 categories of "Places" to choose from.

What hotels are near the convention center? What restaurants are in my biggest supplier's town? *Select Street* will easily give you the answers. Each copy includes one million places – everything from hotels, restaurants, banks, post offices and gas stations to churches, schools, department stores and more. All taken from *Select Phone*, ready for you to pick and plot – right on your map.



4 100 symbols you can drag and drop.

Select Street comes loaded with 100 vibrant symbols so you can easily customize your maps. *Select Street Atlas* lets you customize your own maps right on your screen. We've given you 100 symbols – like dots, pushpins,



With a few simple clicks, you can import all your ZIP+4 addresses and place them directly on a highly-detailed, street-level map. Then use these maps to route your delivery people, divide up sales territories, see where your customers are clustered, or keep an eye on the competition.

Create your own maps - in brilliant color - on your desktop!

new business fast.

arrows, buildings and traffic lights - all in rich vibrant colors, for you to personalize your maps. Use these symbols to identify your customer sites, houses for sale, regional dealers - even your own home. Just pick the ones you need, drag them to

your map, and put them anywhere you want. You can even attach little notes to each symbol, like directions for your sales

force, special delivery instructions, or the phone number and address of your store.

**NO-HASSLE
LICENSE**

invitations and advertising. In essence, anywhere you could use a map. Wow!

**ONE
MILLION
PLACES**

5 The industry's first "No-Hassle License"

You're free to include your maps in advertisements, newsletters, brochures, flyers, and more

Most other mapping products come with a stone-age restriction. You're only allowed to use their products to create maps for one-time use. Not the case with Select Street Atlas. Once you print your maps in black and white - or even in color - you're can use them in your flyers, brochures, newsletters, handouts,

6 The 30-Day Money-Back Guarantee

If you're in business for yourself, if you run a store or an office from your home, if you're looking for a smarter way to find, locate, and close new business, then you owe it to yourself to try Select Street Atlas. Take any ZIP+4 listings from any database and plot them on your map. Choose from the 100 drag-and-drop symbols to make your map gorgeous. Locate and view one million essential places like hospitals, schools, even delis - all taken from the world's leading Phonebook on CD-ROM. And finally, print custom-made maps for distribution to your co-workers, customers, prospects, family, friends, soccer team, and more. So order Select Street Atlas today. Get the best deal on America's most exciting new mapping software. We'll even give you 30 days to make sure you absolutely love it. Call and order now.



It's the only Street Atlas on CD-ROM that lets you import, display, customize, print and use your own personal maps!

\$99⁹⁹

**EGGHEAD
SOFTWARE
NOW!**



For Windows 3.1 and Windows 95

1-800-344-4323

Find what you've been missing.™ **ProCD**

The 10 Levels of Zoom

Imagine the power to zoom down 10 levels of magnification to amazing micro street detail!

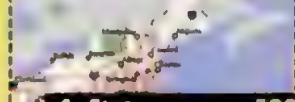
1. National 3,700mi



2. Regional 1,750mi



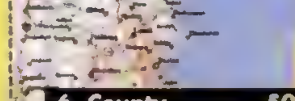
3. Multi-State 1,150mi



4. State 500mi



5. Mid-State 200mi



6. County 50mi



7. City Overview 8 mi



8. City Metro 4 mi



9. Street 2 mi



10. Detail 1 mi



<http://www.procd.com>

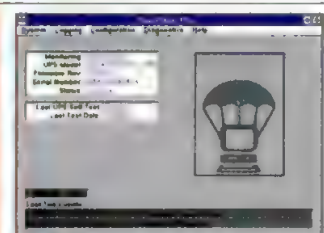
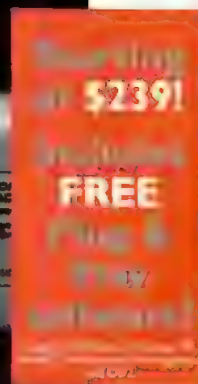
Go home lookups. Read more stories. Call the "first" drive. The PRO CD HOME PAGE is filled with truly useful information. Visit us now.

IT'S NOT IF... IT'S WHEN

Windows® 95 and Windows NT Workstation put the power of a server on your PC. New Back-UPS® Pro™ will keep it there...



If you're about to invest in a new multi-tasking operating system like Windows 95 or Windows NT Workstation, experts say it may be time to invest in APC protection. Why? Because bad power is the largest single cause of data loss, and on a multi-tasking system, your vulnerability is multiplied. When full protection is as affordable as a new mouse, it just doesn't make sense to leave your premium machine unprotected.



You get safe automatic shutdown (whether you're there or not), power event recording for power quality analysis, real-time display of UPS status, and certified Windows 95 Plug & Play compatibility for easy installation.

"...TO TAKE ADVANTAGE OF WINDOWS 95'S SYSTEM AGENT AND DRIVESPACE UTILITIES, A GRACEFUL SHUTDOWN IN THE EVENT OF AN EXTENDED POWER OUTAGE HAS BECOME AN IMPORTANT. APC'S PLUG AND PLAY BACK-UPS PRO 2800... IS ONE Slick PACKAGE." PC COMPUTING



"ORGANIZATIONS CAN FURTHER ENSURE RELIABLE SYSTEM PERFORMANCE BY CHOOSING A UPS LICENSED TO BEAR THE DESIGNED FOR WINDOWS 95 LOGO..." MICROSOFT

"[WITH WINDOWS 95]...USERS ARE KEEPING MORE FILES OPEN AT ONCE AND HAVE MORE DATA AT RISK THAN EVER BEFORE... A UPS IS QUICKLY BECOMING A MUST..." COMPUTERLIFE

"DON'T TAKE CHANCES. GET THE ULTIMATE PROTECTION... FROM APC." PCWORLD

"★★★★...SHOULD BE STANDARD EQUIPMENT ON EVERY DESKTOP... EFFECTIVE, AFFORDABLE, DESIGNED TO LAST..." PC COMPUTING



Protect against the inevitable power hit with new Back-UPS Pro, the one and only UPS "Designed for Windows 95". Automatic Voltage Regulation (AVR) provides the edge you need for full protection against extended brownouts or overvoltages without draining the battery, while CellGuard™ intelligent battery management extends battery life with fast recharge and deep discharge protection. The units even include built-in 10Base-T network cable/phone line surge protection for a bulletproof response to anything Mother Nature or Murphy's Law may send in your direction. Plus they're even backed by an up to \$25,000 guarantee against surge damage to your equipment (see details).

All in all, you can't make a bad choice when you choose the company that protects more PC's than all other UPS vendors combined: APC.

For 6 minutes of runtime on a typical 486, choose BU Pro 280PNP. For Pentiums or more runtime, choose the BU Pro 420PNP or 650PNP. Call for a Free demo Disk, 60-page catalog, or visit our PowerPage™ at <http://www.apcc.com>

SURGEARREST® & PROTECTINET™
AC and dataline surge suppressors.



STARTING AT \$19

BACK-UPS® & BACK-UPS PRO
UPS for PC and advanced workstations



STARTING AT \$119

SMART-UPS® & SMART-UPS V/S
Manageable UPS for servers and networks



STARTING AT \$299

MATRIX-UPS® & ACCESSORIES
Modular UPS for client/server datacenters



STARTING AT \$3499

APC®

AMERICAN POWER CONVERSION
800-800-4APC

Dept E4

401-788-2797 fax / 800-347-FAXX PowerFax™
132 Fairgrounds Rd., W. Kingston RI 02892 USA

and DisconnectAddIn, which Visual Basic's Add-In Manager calls when the add-in is added to or removed from the Visual Basic development environment. The tbMenuItem class's AfterClick procedure contains the code to be executed when the user selects a Toolbar Wizard menu item. The Add-In Manager automatically knows to look for the ConnectAddIn and DisconnectAddIn methods in an add-in, but, as shown below, you've got to know what method to call in response to a menu click.

The VBIDE object-model interface exposes an extensive hierarchy of objects belonging to the active project in the current instance of Visual Basic. Since you can run more than one copy of Visual Basic 4.0 at once (and, in fact, need to do so when testing add-in applications), the top-most object in the hierarchy is the Application object, which identifies the instance of Visual Basic 4.0 that launched the add-in. The Application object has three immediate children: the AddInMenu object hierarchy, through which the add-in defines custom menu items; the ActiveProject object hierarchy, through which the add-in obtains information about forms and components; and the FileControl object, which an add-in can use to monitor a variety of file events for the active project, including DoGetNewFileName, RequestChangeFileName, and RequestWriteFile.

As Toolbar Wizard loads, the declarations section of ConnectClass instantiates a pair of VBIDE.MenuLine objects, tbWizLoadItem and tbWizSaveItem, to hold the two custom menu items. It also creates a pair of tbMenuItem objects, tbWizLoadItemHandler and tbWizSaveItemHandler, to process menu clicks. Then the ConnectAddIn method makes use of these VBIDE.MenuLine objects to add the custom items to Visual Basic's Add-In menu:

```
Set tbWizMenu = VBInstance.AddInMenu
➤.MenuItems.AddMenu("&Toolbar Wizard")
With tbWizMenu.MenuItems
    Set tbWizLoadItem = .Add("&Save
➤current toolbar...")
    Set tbWizSaveItem = .Add("&Load
➤toolbar...")
End With
```

Next, the ConnectAddIn method identifies the event handler for each new menu line by

passing the two tbMenuItem objects to the ConnectEvents methods of the two VBIDE.MenuLine objects:

```
tbWizLoadItem.ConnectID = tbWizLoadItem
➤.ConnectEvents(tbWizLoadItemHandler)
tbWizSaveItem.ConnectID = tbWizSaveItem
➤.ConnectEvents(tbWizSaveItemHandler)
```

Finally, the ConnectAddIn method sets a pair of properties called Operation and VBInstance for the two tbMenuItem objects. Operation is an integer flag that the tbMenuItem object uses to determine which operation (load or save) it is to initiate, while the VBInstance property is an object variable that stores a reference to the Application object, which the tbMenuItem objects will

Visual Basic calls the AfterClick method for the tbMenuItem object associated with that menu item. After first checking to make sure that the active form doesn't have unsaved changes, AfterClick loads either the Load Toolbar or Save Toolbar form based upon the value of the tbMenuItem object's Operation property:

```
If Not CheckForDirt() Then
    Select Case Operation
        Case opLoad
            Load tbLoadForm
        Case opSave
            Load tbSaveForm
    End Select
End If
End Sub
```

There's an interesting point to be made about the AfterClick method's use of the Load command to initiate display of the Load Toolbar or Save Toolbar dialog boxes. My initial impulse was to display the dialogs modally using a command here like tbLoadForm.Show 1. But for some reason, Add-In dialogs displayed modally appear at the bottom of the Z-order, behind any open Visual Basic development environment code or form windows. Most of the shareware and commercial add-ins I've seen suffer from this flaw. But with a little experimentation, I determined that by using the Load command in the AfterClick method, I could force the add-in dialog's window to the top of the Z-order. I did this by including the following commands in each dialog's Form_Load procedure, instructing the dialog to Show its own window and give it the input focus:

```
Show
Me.SetFocus
```

ConnectClass's DisconnectAddIn method, which is called when the Add-In Manager unloads the add-in, reverses the menu customization process carried out by ConnectAddIn. It uses the IDs returned by the ConnectEvents method calls—made by ConnectAddIn—to break the connection between the tbMenuItem objects and the custom menu items, then instructs the VBIDE to remove those menu items:

```
tbWizLoadItem.DisconnectEvents
➤tbWizLoadItem.ConnectID
tbWizSaveItem.DisconnectEvents
➤tbWizSaveItem.ConnectID
```

need to know in order to address any of its child objects:

```
tbWizLoadItemHandler.Operation = opSave
tbWizSaveItemHandler.Operation = opLoad
Set tbWizLoadItemHandler.VBInstance =
➤VBInstance
Set tbWizSaveItemHandler.VBInstance =
➤VBInstance
```

When the user selects either menu item,

```
Const imagelistID = "ImageList"
tbTest$ = "Toolbar " & Combo1(0)

'___first get imagelist name
Open Source$ For Input As #2
    Do While Not EOF(2)
        Line Input #2, linetest$
        If InStr(linetest$, tbTest$) > 0 Then
            '___we found the toolbar
            Do
                Line Input #2, linetest$
                linetest$ = Trim$(linetest$)
                If Left$(linetest$, 9) = imagelistID Then
                    '___we found the imagelist
                    ii% = InStr(linetest$, Chr$(34))
                    If ii% > 0 Then
                        linetest$ = Mid$(linetest$, ii% + 1)
                        ii% = InStr(linetest$, Chr$(34))
                        icTest$ = "ImageList " &
                        Left$(linetest$, ii% - 1)
                    End If
                    Exit Do
                End If
            Loop
            If Len(icTest$) Then Exit Do
        End If
    Loop
Close #2
```

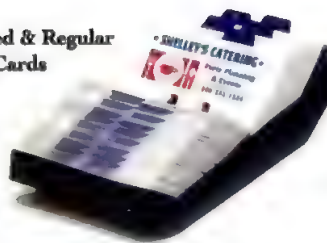
FIGURE 3: SaveTB opens the .TBR file for output and the form's .FRM file for input, then proceeds to read in each line of the .FRM file, looking for the code that Visual Basic uses to describe the specified Toolbar and ImageList controls. SaveTB then copies the toolbar definition lines and every line in between them to the .TBR file.





**Avery Ink Jet Labels
White and Clear**

**Avery Laminated & Regular
Rotary Cards**



**Avery Laser
Note Cards**



**Avery Laser
Videotape Labels**



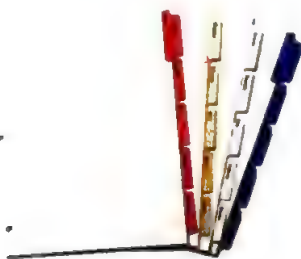
**Avery Laser
Audio Tape Labels**



**Avery Laser
Business Cards**



**Avery Laser
Diskette Labels**



**Avery Index Maker® Dividers
Laser or Ink Jet**



**Avery Laser File
Folder Labels**

**Avery LETTER
'N LABEL™
Quality Bond
Paper and
Address Label
in One**



You paid all that money for all that technology, it's time you got your money's worth. Avery® has a full line of products that let you make better use of your laser or ink jet printer. They'll keep you organized and working more efficiently, easily. In fact, Avery formats are already in the software you're using. We'll even send you a free sample kit while supplies last. So give us a call. And start getting more out of your printer.

FOR A FREE SAMPLE KIT, CALL TOLL FREE:

1 - 8 8 8 - 2 8 3 - 7 9 7 2 e x t . 1 7 9

CIRCLE 055 ON READER SERVICE CARD



AVERY®

Create Hot Graphics for the Internet

with COREL Xara!



Windows® 3.1x
Windows® 95
Windows NT™

Features:

- Anti-aliasing
- Interactive graduated transparency
- Stepless graduated fills
- 32-bit speed and performance
- Drag-and-drop fonts, line styles, colors, clipart, textures and bitmaps
- 3D perspective for vector and bitmap objects

Incredible Value!

- 10,000+ clipart images
- 500+ photos
- 500 TrueType® and Type 1 fonts
- 250 textures

Finally, the Internet graphics package you've been waiting for. An ultra-fast and highly intuitive illustration program, CorelXARA's 32-bit power and full anti-aliasing let you create stunning photo-realistic images and dazzling graphics for the World Wide Web in record time. Featuring a wide selection of flexible drawing and editing tools plus support for transparent and interlaced GIF file formats, with CorelXARA, you're limited only by your imagination.

MicroWAREHOUSE® \$199⁹⁵
1-800-558-4366

Please mention source code PC00696 when ordering. MSB price applicable taxes.

Enter the Corel \$3,000,000 World Design Contest! (September '95 to July '96)
To receive a faxed copy of the contest rules and an entry form, please call:
1-613-728-0826, ext. 3000, Document # 1125. To leave a message:
1-613-728-0826, ext. 81000. To send a fax: 1-613-728-2891.
CIRCLE 011 ON READER SERVICE CARD



Corel and CorelXARA are either trademarks or registered trademarks of Corel Corporation in Canada, the United States and/or other countries. Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

COREL
http://www.corel.com
Call now for faxed literature!
1-613-728-0826 ext. 3000
Document # 1113


```
VBInstance.AddInMenu.MenuItems.Remove
  ➔ tbWizMenu
```

The final bit of relatively standard add-in code is the Sub Main() procedure in MAIN.BAS. This code adds a reference to the add-in to the "Add-Ins16" or "Add-Ins32" section of VB.INI—if none already exists

```
Close #2
tbEvent$ = Combo1(0) & " _"
Terminator$ = "End Sub"
Print #1, "TB_EVENTS"
Open Source$ For Input As #2
Do While Not EOF(2)
  Line Input #2, linetest$
  If InStr(linetest$, tbEvent$) > 0 Then 'toolbar
    event
      Print #1, linetest$
      Do
        Line Input #2, linetest$
        Print #1, linetest$
      Loop Until Trim$(linetest$) = Terminator$
    End If
  Loop
Close #2
Close #1
```



FIGURE 4: SaveTB closes, then reopens the .FRM file, reads through it again, then appends the Toolbar control's event-handler methods to the end of the .TBR file.

there. These .INI sections list the add-ins available for use by the Add-In Manager. Active add-ins have a value of 1, indicating that they are to be loaded automatically with Visual Basic:

```
[Add-Ins32]
Align.Connector=1
RegUtils.ConnectClass=0
DataFormDesigner.DFDCClass=1
tbWiz.ConnectClass=1
```

DOWN TO WORK

So far, the Toolbar Wizard add-in knows how to make its presence known to Visual Basic and how to react to menu-item clicks—functions that nearly every add-in needs to be able to perform. Now it needs to do something special.

All the Toolbar Wizard's unique functionality is contained in four routines: the tbMenuItem class's CheckForDirt method, tbSaveForm's Form_Load and SaveTB methods, and tbLoadFrm's LoadTB method.

CheckForDirt returns a Boolean value indicating whether the active form has unsaved changes. To determine that, it loops through the ActiveProject object's Components collection until it finds the Component whose name matches the name returned by the ActiveProject.ActiveForm's Name property. Then it examines the Component's IsDirty and uses a message box to alert the user if the

form needs to be saved (Figure 2).

If the function determines that the current form needs to be saved, it displays a form called SavePrmpt that instructs the user to do so. Normally one would use a standard message box to convey that kind of information, but message boxes created by an add-in, like modal forms, tend to end up behind the active project window. To get around that, I created a new form called SavePrmpt. The SavePrmpt window looks just like a standard message box, but because it is actually a VB form, it can make use of the method described above to force itself to the top of the Z-order.

There is nothing particularly difficult about the CheckForDirt code, but it does introduce the roundabout methods that you need to use when you're working with the VBIDE object hierarchy. You might expect that the function could be considerably compressed by eliminating the journey through the components collection in favor of something like this:

```
Dim F As Form
Set F = gobjIDEAppInst.ActiveProject
  ➔ .ActiveForm
If F.IsDirty Then ...
```

or even:

```
If gobjIDEAppInst.ActiveProject
  ➔ .ActiveForm.IsDirty Then ...
```

But unlike a ProjectTemplate or Components object, a Form object doesn't include an IsDirty property in its Properties collection. Looping through the Project's Components collection is a simple solution, but in order to arrive at it you need a good understanding of the object hierarchy, something that is difficult to obtain from either the sparse add-in interface documentation or Visual Basic 4.0's anemic object browser. I felt lost at sea until I started using Apex's superior VBA Companion object browser to analyze and navigate through the object hierarchy.

The Form_Load for tbSaveForm (the Save Toolbar dialog box) is responsible for populating a pair of combo boxes with the names of all the Toolbar and ImageList controls it finds on the active form. In order

to do so, it loops through the active form's ControlTemplates collection in order to obtain the class name of each control on the form and then compares those class names with those of the ImageList and Toolbar controls:

```
Dim i%, testControl As Object
With gobjIDEAppInst.ActiveProject
  ➔ .ActiveForm
  For i% = 0 To .ControlTemplates.Count
    ➔ - 1
      Set testControl = .ControlTemplates(i)
      Select Case testControl
        Case Is = "ComctlLib.ImageList"
          Combo1(1).AddItem testControl
          ➔ .Properties.Item("Name")
        Case Is = "ComctlLib.Toolbar"
          Combo1(0).AddItem testControl
          ➔ .Properties.Item("Name")
        Case Else
          End Select
      Next i%
  End With
```

THE SAVETB METHOD

Once you have identified the toolbar you want to save and have clicked the Save button, the SaveTB method performs its magic—and magic it is. For a long time, I doubted whether it would even be possible to save toolbars from within the add-in interface. I kept trying new ways to extract the information that Toolbar Wizard would need to do so through the add-in Interface, and each time I would get about three-quarters of the way there before the add-in API proved itself incapable of delivering that information.

After many attempts and much experimentation, I realized that the inability to access this and other properties made it impossible to use the add-in API to extract the information necessary to reproduce a toolbar. Toolbar Wizard could neither read the necessary information directly through the API nor interact with the Properties dialogs that could provide that information. Instead, it would have to extract the information from the active form's .FRM and .FRX files. (The .FRM file contains ASCII text describing the form's contents and the properties and methods of each of its components, while the .FRX file contains binary data such as the form's icon or the bitmaps contained in an ImageList.)

Thus, SaveTB starts off by obtaining the names of the current form's .FRM and .FRX files, which are found in the FileNames collection of the Component object that represents the form. The routine identifies the form object within the Components collection by comparing the string returned by the ActiveForm object's Name property to the Name property of each Component object:

PRICE BREAK!

YOUR ABSOLUTE BEST VALUE PERFORMANCE SYSTEMS!



**150MHz Pentium®
Internet Multimedia
System for only
\$1999**



**PC
MAGAZINE
EDITORS
CHOICE
CTX
1765GMO**



AWARD WINNING SYSTEMS

Check out the all new Magna Media and Magna Graphics Media! Loaded with top of the line features such as standard 256KB pipeline BURST cache RAM to boost the overall system performance by as much as 30% over the standard asynchronous cache RAM, the new EDO performance enhanced RAM is also standard with all the systems which increase the performance of the systems by approximately 5% over regular page mode RAM. With these fine features plus unbeatable values and prices, no wonder PC Computing in Jan. 1996 and PC World in Feb. 1996 issues rated Maximus' Magna Media & Magna Office the best overall systems reviewed.



WARRANTY & SUPPORT

Not only we offer great performance, superior design & engineering, we back all the systems with 30 Day Money Back Guarantee, Lifetime Toll-Free Technical Support, Lifetime Labor & One Year Parts Warranty which can be extended up to 4 year with our optional GE Service Protection Plan.

Lotus SmartSuite 96 CD Bundle



Microsoft CD Bundle



Designed for



MAGNA GRAPHICS MEDIA SYSTEM

MAGNA MEDIA

\$1999

BUSINESS LEASE: \$62/MONTH

- Intel Pentium 150MHz Processor
- 256KB Synchronous Pipelined BURST Cache
- Intel Triton PCI Chipset Architecture
- 16MB EDO Performance Enhanced Memory
- 1.6GB EIDE Hard Drive
- ATI mach 64 Video Xpression PCI w/2MB EDO RAM (MPEG Playback w/Full Screen & Motion Video)
- MPEG Playback Video Software
- 28.8 Voice Fax/Modem with Software
- 6X EIDE CD-ROM Drive
- 16-bit Sound Card & Speakers
- 15" SVGA Flatscreen Color Monitor (Optional 17")
- 104-key Keyboard & Serial Mouse
- Smart Design 8-Bay Tower Case
- Microsoft Windows 95 on CD
- Choice of Lotus SmartSuite 96 or Microsoft Works Money, Encarta 96 & Entertainment CD Bundle
- 1.44 MB, 3.5", Floppy Disk Drive
- Netscape Navigator WWW Browser, Eudora E-Mail, America On-Line, CompuServe software.*

\$1879

133MHz Pentium Processor

\$2149

166MHz Pentium Processor

* Sign up required

MAGNA GRAPHICS MEDIA

\$2399

BUSINESS LEASE: \$75/MONTH

- Intel Pentium 166MHz Processor
- 512KB Synchronous Pipelined BURST Cache
- Intel Triton PCI Chipset Architecture
- 16MB EDO Performance Enhanced Memory
- 2.0GB EIDE Hard Drive
- ATI mach 64 Video Xpression PCI w/2MB EDO RAM (MPEG Playback w/Full Screen & Motion Video)
- MPEG Playback Video Software
- 28.8 Voice Fax/Modem with Software
- 8X EIDE CD-ROM Drive
- Plug 'n Play AW32 Wavetable Sound Card
- 300 Watt 3D SURROUND Sound Speakers
- 15" SVGA Flatscreen Color Monitor (Optional 17")
- Microsoft Windows 95 on CD
- Choice of Lotus SmartSuite 96 or Microsoft Works, Money, Encarta 96 & Entertainment CD Bundle
- 1.44 MB, 3.5", Floppy Disk Drive
- 104-key Keyboard & Serial Mouse
- Smart Design 8-Bay Tower Case
- Netscape Navigator WWW Browser, Eudora E-Mail, America On-Line, CompuServe software.*

\$2129

133MHz Pentium Processor

\$2249

150MHz Pentium Processor

* Sign up required

CIRCLE 068 ON READER SERVICE CARD

**Call for other MAXIMUS
Award Winning Systems!**

TO ORDER, CALL

**MAXIMUS
800-888-6294**

Internet <http://www.maximuspc.com>



MAXIMUS COMPUTERS, INC.

International: 818.305.5925 • Fax: 818.357.9140
710 E. Cypress Ave., Unit A • Monrovia, CA 91016
Hours: Monday-Friday 7-7 Saturday 9-5 P. S. T.

© 1996 Maximus Computers, Inc. All rights reserved. Prices & Specifications are subject to change without notice. Intel, Intel Inside and Pentium Processor are registered trademarks of Intel Corporation. All other names and trademarks are the property of their respective owners. 30-day money back guarantee does not include return freight, original shipping / handling, taxes, options, software. All orders must be with T.A.S. number and shipped in the original condition prepaid and insured. All photographs are for customer purposes only and may not be a true representation of actual products. Loans provided by AT&T Capital based on 48 months low initial value. We thoroughly check every credit card for your protection. Not responsible for errors in advertising.

"Print Screen" In Windows!

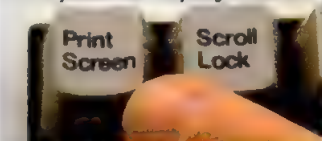
Just Like You Did In DOS. Print Anything With A Keystroke!

Introducing Print Screen, a new program that will instantly print all Windows screens with the press of a button. So simple to use, and with over a thousand uses. Print Screen is specifically designed for all Microsoft Windows platforms, including Windows 3.x and Windows 95.

Use Print Screen for: • **Surfing the Internet** • **Running CD games** • **Using Online services** (ADL, CompuServe, Prodigy, etc.) • **Working on the network**

Print Screen is a must-have utility for every Windows user! It's perfect when you're surfing the Internet and you discover a great-looking home page, or you see a picture of a new product you just have to know more about. When you're running your favorite CD-ROM software and you want to share an exciting moment with someone else (to prove you really did make it to the 25th level), just hit a key for an instant printout. You can capture all the information you need permanently on paper from online services such as America Online, CompuServe, and Prodigy, plus bulletin boards too. In the past, this kind of printing

One Keystroke Prints Anything In Windows!



"Print Screen is an excellent utility that brings your Print Screen key back to life under Windows by printing the active window or full screen either to a printer or a fax driver."

—PC Magazine, February 28, 1996.

convenience was impossible—now it's one click away! Operates seamlessly on all Windows platforms: Windows 3.x, Windows 95, Windows NT and Windows for Workgroups.

Auto Save The entire screen or the active window to a .BMP file which can be read by most Windows programs.

• **Print** To any printer or fax; portrait or landscape.

• **Fast Printing** Sends your Print Screen image to any Windows printer faster than ever before. No endless waits!

• **Reverse**... improves output quality on low resolution printers by printing the negative of a Print Screen image. Print Screen has a thousand uses—get this effective utility today! A smash hit new title!

JE Software

#J27-1000 Print Screen WIN \$29.95

WIN95 • WIN3.1 • 16-BIT

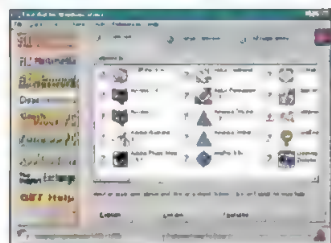
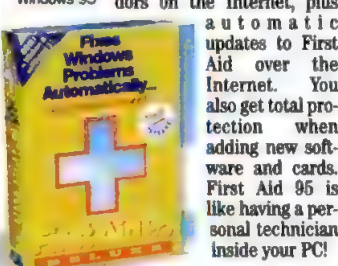


First Aid 95 Automatically Fixes Windows Problems!

First Aid 95 Deluxe Provides 4 Levels Of Rescue For Your PC!

How many times has a General Protection Fault or other Windows problem paralyzed you? Just count the wasted hours, the work lost, and the need to recreate unfinished projects that evaporated in the crash. But now there's an amazingly intelligent, automatic solution to all that! First Aid 95 is designed for non-experts. It fixes problems automatically! Eliminate calls to tech support, save your work after you get the infamous "General Protection Fault" crash, even fix CD-ROM and sound card problems. All done automatically!

First Aid 95 Deluxe goes even farther with miraculous revival of your PC when it won't boot at all. Get instant connection to vendors on the Internet, plus automatic updates to First Aid over the Internet. You also get total protection when adding new software and cards. First Aid 95 is like having a personal technician inside your PC!



The only product that fixes setup and operation conflicts with leading Windows applications!

EXCLUSIVE TIGER OFFER:

Purchase First Aid 95 Deluxe or First Aid 95 And

GET A FREE

CD-ROM

"Windows 95 Made Easy"

a \$59.95 value!

CyberMedia

#C68-1030 First Aid 95 Deluxe CD

WIN 95/3.1 \$59.95

#C68-1006 First Aid 95 3.5"

WIN 95/3.1 \$39.95

#C68-1007 First Aid 95 CD-ROM

WIN 95/3.1 \$39.95

Don't forget to ask for your free gift, "Windows 95 Made Easy" CD-ROM. Ask for part #C68-200P. While supplies last!

PERSONAL TRAINING SYSTEMS.

WIN95 • WIN3.1 • 32-BIT

File Names 255 Characters Long In WIN 3.1 & WIN 95!

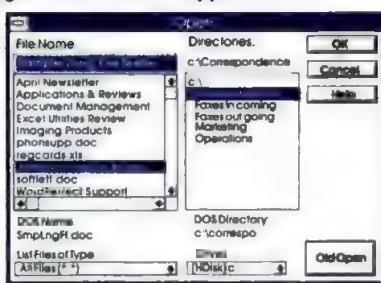
Without Having To Upgrade Your 16-Bit Applications

Get the benefits of WIN 95 — NOW! Long File Names gives you long file names with your current Windows applications — whether you are running Windows 3.1 or Windows 95!

Windows 95 has some terrific features. But if you're planning to upgrade, here's something you should know: If you want to use Windows 95's new long file name capability, you have to upgrade all your applications to their new Windows 95 versions!

Sticking With Windows 3.1? Right now you're happy with Windows 3.1. With Long File Names for WIN 95 and WIN 3.1, you can create file names up to 255 characters long, for all your applications.

Organize Your Files ... Quickly! One of the biggest frustrations I have with computers lies in having to dream up—in only eight characters—a descriptive name for every one of my files. As long as the file has a super-simple name, no problem. But what if it's something like Northern Sales



Create clear, meaningful, descriptive titles! Long File Names makes it simple! No more cryptic names!

Tracking For Fiscal Year '96? You wind up with a file called NSTRFY96. (I actually found a file by that name on my system recently!) How about JF#SEP01? Multiply that by several hundred files and it's obvious you're in big trouble when you need to find a file in a hurry. Fortunately, liberation from eight-character file names is at hand—with Long File Names for Windows. Long File Names uses the same File, Open and Save As commands you are used to.

VIEW Software

V31-1100 Long File Names For

Windows 95 WIN \$29.95

WIN95 • WIN3.1 • 32-BIT

The Desktop "In-And-Out" Board

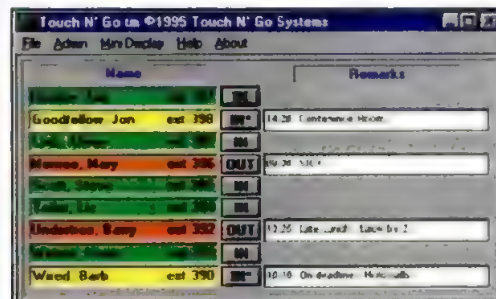
Track Everyone's Status In Your Office!

Touch 'N Go™ is an easy-to-use software program primarily designed to track the in or out status of employees in a small to medium-sized office (up to 20 users). Unlike the standard in and out boards used in offices for years, Touch 'N Go operates electronically. Any user on your network can pull-up the Touch 'N Go board using either a detailed display screen or a mini-display screen tailoring it to meet your office needs. Touch 'N Go uses a single data file residing on a networked file-server or, in the case of Windows for

WorkGroups, Windows NT, or Windows 95, in a shared directory. User windows (display screens)

update this central data file as individual changes are made. Once every minute, the program queries the data file and updates all user displays with any changes made by users connected to the network.

This program runs on any network



No guesswork, no misunderstandings. You'll know who's where and when to expect them. Great new network title!

Touch 'N Go Systems, Inc.

T81-1000 20 User Version 1.41 .. \$64.99

WIN95 • WIN3.1 • 16-BIT

FREE CheckFree®

With Any Order From Tiger!

Pay your bills electronically! CheckFree sends many payments electronically, transferring funds from your account on the date you specify!

Ask for #C124-1000 • plus \$5.95 shipping and handling.

HOW TO ORDER

We're open around the clock from Monday 8 a.m. until Saturday 12 Midnight and Sunday 8 a.m. until 11 p.m. (EST). Please call us at (800) 285-8443 to place your order or fax to (306) 529-2990. International customers call (306) 671-3300.

CORPORATE, EDUCATIONAL AND VOLUME SALES: Call (800) 268-8710 for quantity pricing volume bids, educational bids, and site licenses.

PAYMENT: VISA, MasterCard, American Express, Discover Card, Carte Blanche, Diners Club, personal checks and money orders. We DO NOT CHARGE YOUR

ACCOUNT until we have SHIPPED your order!

SHIPPING METHODS: Overnight on in-stock items. Areas serviced overnight by UPS may be shipped UPS, FedEx or Airborne. Back Orders shipped "best way".

30 DAY GUARANTEE. Everything you buy from Tiger is backed by our 30-Day Guarantee against defects. If your new Tiger computer is defective, we will gladly and promptly repair or exchange it for a new unit. Sorry, no refunds. Of course, prices are always dropping on CPUs and Motherboards. Tiger does not give protection on these items in the event prices do drop.

OVERNIGHT DELIVERY

Upgrade To The World's Fastest PC: Just \$549⁹⁹

Want to run Windows 95 on the world's fastest computer? You can with these hot new processors from Cyrix! The new Cyrix 6x86 series have been tested, proven, and are now ready to run on your desktop like nothing you've ever seen before. Cyrix is faster than the Pentium. Faster than the Pentium Pro. Faster than any other PC on Earth for running DOS, Windows 3.1, Windows 95, and all your favorite applications. And at this low price, this upgrade is unbeatable.

It's Easier Than You Think! Today's PCs are amazingly easy to remove and install parts. This kit includes a Cyrix CPU already mounted on a PCI motherboard, installed in this roomy case with power supply. You simply remove the hard disk, video card, floppy drive and RAM chips from your old PC (just a few screws and cables) and slip them into this hot new 6x86. It's easy! We've even included a video to show you how.

6th Generation Speed Devours The Pentium! The Cyrix 6x86 is proven compatible with Windows 95, Windows NT, Windows for Workgroups, Windows 3.1, 3.0, DOS, NetWare and OS/2. Check the specs and you'll see the Cyrix is faster than any other PC processor. The Cyrix 6x86 processors are the absolute fastest available for both 16 and 32-bit Windows applications—the kind businesses use both now and in the future. Technically speaking, the 6x86 has features found only in the Pentium Pro and PowerPC 604 chips. But unlike the Pentium Pro, the 6x86 is optimized for 16-bit and 32-bit Windows software. Intel's Pentium Pro was built for systems that don't exist on the desktop yet. Cyrix's 6x86 was built for Windows 95, Windows 3.1 and DOS—all the applications that are important today and for many years to come. The 6x86

includes an 80-bit FPU for math calculations, 32 registers (versus 8 in the Pentium), dual pipelines for twice as many instructions as the Pentium, and lots of other technical advances. But the bottom line is this: the Cyrix 6x86 is the fastest, fully compatible x86 processor in the world. It runs DOS, Windows 3.1 and 95 software faster than anything else.

How about the motherboard? The onboard Intel Triton chipset is the industry's most trusted, high-performance chipset for super-fast PCI bus speeds. The 256K of pipelined, write-back/write-through SRAM is the fastest made. It supports the fastest EDO RAM (or your existing RAM). The 16550 Serial ports and high-speed Parallel port are the best to be found. And the onboard PCI controller delivers maximum throughput for the fastest hard disks. It's everything you'd expect from the world's fastest Windows PC.

Double Cooling Fans We'll ship this kit with a cooling fan and heatsink already installed on the CPU. Plus, there's a second cooling fan on the power supply, making this an ideal server.

This Cyrix 6x86 processor, motherboard and case is the ultimate upgrade you can buy for your PC. With the free installation video, anyone can easily use their existing hard disk and other parts to build the world's fastest PC. This kit includes case, motherboard, 6x86 processor, 200-watt power supply, onboard controller and more. Call our upgrade experts for more information.

Cyrix X86 COMPLETE 686 KIT!

Simply Transfer Your Hard Drive, Video Card And Peripherals. Takes About An Hour! ...And—It's Faster Than A Pentium!

Fully Compatible! Giant Cache! Runs On Any Network!

Includes: Case, Motherboard, 686 Chip, I/O Controller, Double Cooling Fans, Power Supply.

Save Thousands! Own A 686 PC!

Faster Than Intel!

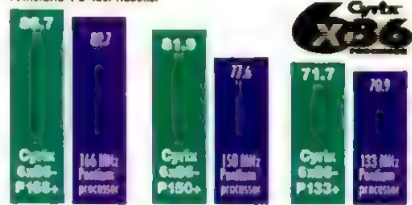
Use Your Existing Parts!



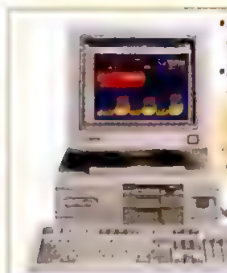
Shine with Processor Cooling Fan already installed.

Cyrix Beats The Pentium

Winstone 96 Test Results:



Turn PC Images Into Dazzling TV Presentations!



- Connect to VCR for video taping or computer-aided video production
- Converts computer VGA signal to TV

Just connect to your laptop, notebook, desktop, VCR, computer to any size TV for clean, flicker-free images!



- Clean, flicker-free computer images on any TV
- DOS, Windows 3.x and Windows 95 compatible
- TV/VGA concurrent display, TV auto blanking

The Grand Vision PC Wizard is a new technology "frame converter" computer to TV peripheral that replaces obsolete older technology "scan converters" and bulky, fragile, "LCD Panels." The PC Wizard is a palm size tool that sends still or moving images and text from any computer screen onto any size

TV, television projector, or VCR, with better than broadcast quality. It comes with everything you need in a small zip travel case. Grand Vision PC Wizard requires no software, no hot keys, and no additional memory. The Wizard automatically works with VGA and SVGA video outputs—no changes from standard setup needed. Frame conversion technology guarantees vastly improved picture quality; you've got to see the sharpness, the lucid, absolutely flicker-free color shadings to believe them!

Dobbs-Stanford Corporation
#D33-1002A Grand Vision PC Wizard \$399.99
With carrying case.



Return instructions and our return policy are included in your order. Alaska, Puerto Rico and Hawaii add an additional \$10 delivery charge. International orders charged additional shipping & handling. Tiger reserves the right to substitute product of equal or greater value. ALL PRICES AND OFFERS SUBJECT TO CHANGE. TigerSoftware is a registered trademark of TigerDirect, Inc. All trademarks appearing herein are acknowledged. Not responsible for typographical errors or errors in technical description of products herein.

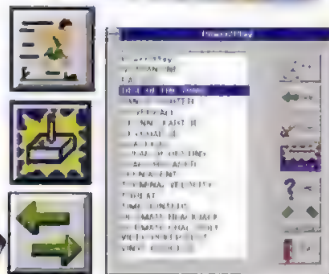
Play Any DOS Game From Windows!

Easy One-Step Setup With A Single Mouse Click From Windows 95 or Windows 3.1!

This is a must-have utility for anyone who wants to play all the blockbuster DOS games from Windows 95 or Windows 3.1! It's called **PowerPlay**—don't forget the name. This sensational new breakthrough program will have even the toughest DOS game up and running from Windows in no time! **PowerPlay** eliminates Windows memory and sound conflicts, CD-ROM "Invalid Drive Specification" errors, system lock-ups, complicated setups and system restarts.

"**PowerPlay** will let you play the most recalcitrant of resource-hungry DOS games while running Windows 3.1 or Windows 95. Most games run by a single click from the **PowerPlay** menu without user intervention..." *PC Magazine, 2/20/96*. **PowerPlay** is the revolutionary new game launcher for every Windows user who wants to run all the great DOS games with the ease of a single mouse click! What a great idea! AND you'll receive a **FREE BONUS**: A sleek, powerful Windows 3.1 un-installer to clean away those fragments and pieces of debris that clog your system—and 70 of the hottest DOS Shareware games!

FREE Bonus!
un-installer & 70
Shareware Games!



Say good-bye to complicated setups! Just add your DOS games or applications to the **PowerPlay** menu...then click and run!

The Software Labs **WIN95+WIN31+16 BIT**
#S116-1000 **PowerPlay** \$24.99

Shipping Charges:

First Item \$6.99
Each Additional Item... \$1.00

Shipping & handling is \$6.99 for the first item, and \$1.00 for each additional item up to 7 pounds total. Overweight orders (over 7 lbs.), shipping & handling charges are \$1.00 per pound. UPS shipping and handling charges apply to computers, hardware and peripherals
CIRCLE 066 ON READER SERVICE CARD

IN STOCK AND READY TO SHIP!

800-285-8443

Please Mention Code "CCB"


```
With gobjIDEAppInst.ActiveProject
  CurrFormName$ = .ActiveForm
  ➤.Properties.Item("Name")
  With .Components
    For i% = 0 To .Count - 1
      If .Item(i%).Name =
        ➤CurrFormName$ Then
        CurrFormFiles$(0) =
        ➤.Item(i%).FileNames(0)
        CurrFormFiles$(1) =
        ➤.Item(i%).FileNames(1)
      End If
    Next
  End With
End With
```

After using a standard Save As dialog to obtain the filename for the new .TBR file, SaveTB needs to determine the name of the ImageList control associated with the current toolbar. To do so, it opens the form file for input and reads through that until it locates the toolbar definition code. Then, continuing to read the file, it looks for the ImageList property definition within that code. Finally, upon locating and parsing the ImageList name, it closes the input file (Figure 3).

Having located the ImageList name, the SaveTB routine finally has all the information it needs to actually save the toolbar. To do so, it opens the .TBR file for output and reopens the form's .FRM file for input, then proceeds once again to read the .FRM file line by line, looking for the code that Visual Basic uses to describe the specified Toolbar and ImageList controls. The definition for a toolbar control named Toolbar1 would start with a line that includes the text "Begin ComctlLib.Toolbar Toolbar1" and conclude with a line reading "End", so that the SaveTB method copies those lines, and every line in between them, to the .TBR file.

Having copied the two control definitions, SaveTB closes the .FRM file, reopens it once again (thus resetting the pointer to the top of the file) and reads through it again. It looks for the toolbar control's event-handler methods, which it appends to the end of the .TBR file (Figure 4).

Finally, SaveTB copies the form's .FRX file to the directory in which the .TBR file is stored, giving the copied file the same filename root as the .TBR file. So if the user had specified that he or she wanted to save DBAPPS.TBR in C:\Toolbars, the .FRX file would be copied to C:\Toolbars\DBAPPS.FRX. Though it might seem a bit wasteful to copy the entire .FRX file, these files tend to be quite small, and copying the file is both easier and more reliable than attempting to extract from it only the relevant binary data.

REUSABILITY AT LAST

The Load Toolbar dialog box's LoadTB function is where Toolbar Wizard finally gets to

make its contribution to the sanity and happiness of Visual Basic developers, by making it possible to load toolbars previously stored by the SaveTB function onto any Visual Basic form.

Because LoadTB can be used to add Toolbar controls to forms in projects that haven't been configured to use the Windows 95 common controls, it begins by using the Active-

The Load Toolbar dialog box's LoadTB function is where Toolbar Wizard finally gets to make its contribution to the sanity and happiness of Visual Basic programmers.

Project object's AddToolboxTypeLib method to add those controls to the Visual Basic toolbox. In order to do so, it passes the common controls type library's GUID (globally unique identifier), its major and minor version strings, and its filename to the AddToolboxTypeLib method. (This generates an error if the project already contains a reference to the COMCTL32 type library, hence the use of On Error Resume Next).

```
Dim guid$, major$, minor$, ocx$
guid$="(6B7E6392-850A-101B-AFC0-
➤4210102A8DA7)"
major$="1.0"
minor$=""
ocx$="COMCTL32.OCX"
With gobjIDEAppInst.ActiveProject
  On Error Resume Next
  .AddToolboxTypeLib guid$, major$,
  ➤minor$, ocx$
  On Error Goto 0
```

Next, LoadTB proceeds to add the code from the .TBR file specified by the user to the active form by (1) using the ActiveProject object's RemoveComponent method to remove the specified form from the active project; (2) renaming the form file with a temporary name; (3) opening the temporary file and the .TBR file for input and a new target file with the .FRM file's original name for output; (4) copying the temporary file line by line to the target file until it reaches the beginning of the section describing form controls; (5) copying the descriptions of the ImageList and Toolbar controls from the .TBR file to the target file; (6) copying the remainder of the temporary

file to the target file; and finally, (7) copying the Toolbar event-handler code from the .TBR file to the target file.

At the end of this process, the target file, which bears the name of the original .FRM file, will contain all the contents of the original .FRM file, plus descriptions of the Toolbar and ImageList controls at the very beginning of the control description section (which begins following the line that specifies the form's Width property), and event handlers for the Toolbar control at the end of the event-handler section. (There is nothing special about these locations within each section other than the fact that they're easy to locate and seem to work just fine.)

The code used to accomplish all this closely mirrors that of the SaveTB function, since, for the most part, LoadTB is simply reversing the process of that function. For the Toolbar and ImageList controls to work as expected in their new home, however, LoadTB does have to make two changes to the code stored in the .TBR file. First, it modifies all references to the ImageList and Toolbar controls to reflect the names specified by the user in the Load Toolbar dialog box, using simple string substitution techniques. More critical, it needs to modify all .FRX file references in the control definitions. For instance, the definition for an ImageList control taken from a form named Form2 and containing five images would use statements like this to specify the locations of the bitmaps within the .FRX file:

```
i1 = "Form2.frx":11EC
i2 = "Form2.frx":13A3
i3 = "Form2.frx":155A
i4 = "Form2.frx":1799
i5 = "Form2.frx":1950
```

Before it copies those statements to the target file, LoadTB substitutes the name and path of the current .TBR file's .FRX file:

```
qm = Chr$(34) 'quotation mark
Const frx = ".frx"
frxTarg$ =
➤ExtractFilePath$(gfnameTBRFile) +
➤ExtractFileRoot(gfnameTBRFile)
...
If InStr(1,inetest$, frx) > 0 Then
  i% = InStr(1,inetest$, qm)
  1inetest$ = Left$(1inetest$, i%) +
  ➤frxTarg$ + Mid$(1inetest$,
  ➤(InStr(1,inetest$, frx)))
End If
```

Thus, the ImageList definition in the target file would read something like this:

```
i1 = "C:\Toolbars\DBAPPS.FRX":11EC
i2 = "C:\Toolbars\DBAPPS.FRX":13A3
i3 = "C:\Toolbars\DBAPPS.FRX":155A
```



ALR Has an Even Better Balancing Act.



ALR OPTIMA MT

100-MHz Pentium Technology
8-MB RAM (exp. to 128-MB)
800-MB IDE Hard Drive
Integrated 1-MB PCI graphics
4X IDE CD-ROM Drive
1.44-MB Floppy Drive
Two 32-bit PCI and three ISA Expansion Slots
Three 3.5" and three 5.25" Drive Bays
100-Watt Power Supply

Windows 95 or Windows for Workgroups/NT 3.22

5 Year/36 Month Warranty with
first year of On-Site Service Free*

\$1599 MSRP



pentium®
PROCESSOR

Nobody balances power with affordability better than ALR. For proof, just look at the 100-MHz ALR OPTIMA MT bundle. Powered by a 100-MHz Pentium processor, it's loaded with all the extras that serious business users want in a ready-to-run PC. Extras like integrated 64-bit PCI graphics, a fast CD-ROM drive, and a chassis that's large enough to handle the I/O and storage demands of today's more sophisticated business applications. Its size and performance make it an ideal small business PC, while its built-in power management and security features also make it an outstanding corporate workstation. And talk about value... just check out that suggested retail price.



It's the same balance of performance and affordability that you'll find throughout the ALR

OPTIMA series. Boasting a variety of chassis styles and speeds up to 150-MHz, the ALR OPTIMA series has the system you want, and the power you need, at a price you can afford.

And whichever ALR OPTIMA you choose, you'll receive the quality and reliability that you've come to expect from ALR's award-winning systems. Quality that's backed by a 5 Year/36 Month Limited Warranty and industry leading service and support.



warranty

So you see, there's no trick to balancing computing power with a limited budget once you decide to *optimize* your business. To find out how, call our toll free number.

1-800-444-4ALR (ref# 5404)

FIRST TO HARNESS
THE POWER OF
FOUR 100
MHz
PENTIUM
CHIPS



ALR
Advanced Logic Research, Inc.

ALR is on the Internet - <http://www.alr.com>, CompuServe - GO ALRINC, & America Online - Keyword ALR *Requires one-time registration fee of \$9.95. Advanced Logic Research, Inc. 9401 Janssena, Irvine, CA 92718 (714) 881-5779 FAX: (714) 881-6940. Prices, configurations and specifications subject to change without notice. Systems shown with optional equipment. Pricing based on U.S. dollars. ALR is a registered trademark of Advanced Logic Research, Inc. Pentium logo and Intel Inside logo are trademarks of Intel Corporation. All other brand and product names are trademarks or registered trademarks of their respective owners. 05/98 ALR

CIRCLE 064 ON READER SERVICE CARD

Nothing comes closer to reality.



**You've always wanted a monitor this good.
Now you can afford one.**



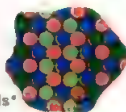
No other Windows 95 big screen monitor gives you more: The finest dot pitch money can buy. The ability to display 40% more pixels than competing aperture grill monitors. 1600 x 1200 maximum resolution. It all adds up to crisper detail and improved readability, even for very small text. And at \$1,995 (MSRP), it's an extraordinary buy. To learn more, send for our free monitor buyer's kit. Call NSA at 800 441-4832. Or dial our faxback system at 800 555-8552.

SuperScan Pro 21

Model CM2110MU, 21 inch flat CRT.
(20.0" Viewable Image Size)

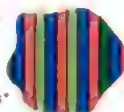
- 0.22 mm horizontal pitch
- VGA to 1600 x 1200
- 31-85 KHz, 50-160 Hz

SuperScan 21" shadow mask
0.22 mm horiz. pitch
0.21 mm mask
1818 displayable pixels*



0.22 mm

Competitors 21" aperture grill
0.31 mm stripe pitch
0.30 mm mask
1290 displayable pixels*



0.31 mm



SuperScan
A Hitachi Company

HITACHI

NSA 100 Lowder Brook Drive Westwood, MA 02090
Tel: 800 441-4832 Faxback: 800 555-8552

*Assumes 400mm horizontal display size. The ENERGYSTAR™ emblem does not represent EPA endorsement of any product or service.

CIRCLE 143 ON READER SERVICE CARD

14 = "C:\Toolbars\DBAPPS.FRX":1799
 15 = "C:\Toolbars\DBAPPS.FRX":1950

Here I was able to take advantage of a little bit of automatic work on the part of the Visual Basic design environment. Visual Basic correctly loads a control containing references to an .FRX file other than that of the current form, but as soon as the form is saved, the control's images are copied to the form's own .FRX file and the reference is changed to point to that file. Thus the .TBR file's original .FRX file remains unchanged and ready for use with other forms, while the form's own .FRX file contains all the bitmaps it needs to display the Toolbar LoadTB copied from the .TBR file.

LoadTB concludes by instructing the ActiveProject object to add the newly toolbar-equipped form back into the project, using the object's AddFile method. This adds the form to the project and highlights its name within the Project window, but it does *not* display the form—so there is no immediate proof that the toolbar has been added to the project. I found this—combined with the lack of a command to display a specified form—pretty frustrating, so I came up with one last neat hack. The caption of the Project window displays the root of the Project's filename, so LoadTB passes that root to Visual Basic's AppActivate method (thereby activating the Project window), then sends an {ENTER} keystroke to the Project window, thereby “clicking” the View Form button for the highlighted file—which just happens to be the form we want to view:

```
x$ = gobjIDEAppInst.ActiveProject
➤.AddFile(Target$)
tmpfile$ =
➤ExtractFileRoot$(gobjIDEAppInst
➤.ActiveProject.FileName)
AppActivate tmpfile$
SendKeys "{ENTER}"
```

That concludes the LoadTB function and with it, the range of Toolbar Wizard's capabilities. All the program and source code mentioned here is available from PC Magazine Online. See the “Guide to Our Utilities” sidebar in the Utilities column for access information.

All in all, I'm pretty happy with how Toolbar Wizard came out, but it took a lot more effort than it should have. The Visual Basic add-in API and the object hierarchy that it exposes are far too limited. One can only hope that those limitations will be addressed in future versions of Visual Basic. □

Paul Bonner is a Boston-based freelance writer, systems consultant, and specialist in visual programming. He can be reached at pbonner@zd.com.



SUBSCRIPTION SALE



Answers. Advice. Strategies. Solutions.
22 times a year, you get it all
from PC MAGAZINE.

To reserve big savings,
call toll-free:

1-800-289-0429

BONUS:

Free CD-ROM with your
paid subscription!

The fastest and easiest way to ZIP and unZIP files in Windows!

Zip. Zap. Zoom.
That's how easy it is to extract and compress files in Windows 95 and Windows 3.1—when you're using new Vertisoft Zip-It.[™]
Zip! Zip-It lets you shrink the size of the files up to 98%. It's 100% PKZIP[™] compatible and 100% Internet-ready.

Zap! Creating a ZIP file is effortless. Simply pick the one you want, then drag and drop it on Zip-It's window.

Just point, click, and zzzzoom!—you can instantly view, extract and edit your files, or run a program from a ZIP file. Plus: Our exclusive Zip-It Plus feature creates Windows self-extracting files you can easily share with others.

So why fumble around with DOS?

To find your nearest Zip-It retailer, zip to the phone and give us a call at 1-800-466-5875, Ext. Z406.



Look for these other essential Vertisoft utilities.

Zip-It[™]

Shrink the size of your files up to 98%.



Circle 284 on reader service card.

<http://www.vertisoftsys.com>



Zip-It and Name-It are trademarks and Remove-It is a registered trademark of Vertisoft Systems, Inc. PKZIP is a trademark of PKWARE, Inc. Windows and MS-DOS are registered trademarks of Microsoft Corporation. © 1995 Vertisoft Systems, Inc. All rights reserved. Four Embarcadero Ctr., Suite 3470, San Francisco, CA 94111.

Now

**You Can Answer
Your Mother's Prayer.**

Introducing Connectix Color QuickCam™, the camera and software that lets you use your computer in fun ways at home, business and on the net. Send personalized cards. Add images to business reports. Videoconference with additional software. Spiff up your web site. Get Color QuickCam for under \$200*. Just plug it in, install the software and start taking brilliant color pictures and video on your computer.



CIRCLE 017 ON READER SERVICE CARD

Appear Nightly

In Her Living Room

In Living Color.



1-800-571-7558 or www.connectix.com

Estimated retail price
\$199.99 suggested.

Now You Can With Color QuickCam

For Windows and Mac platforms. Available at select computer products stores.



Packard Bell.

**WINDOWS® 95
PRE-LOADED!****\$1999⁹²**MONITOR SOLD
SEPARATELY**PLATINUM I**

- 133MHz processor
- 16MB RAM
- 1.2 Gig hard drive
- 4X CD-ROM
- 28.8 Fax modem

#12-10689

COMPUTERS

DESCRIPTION	SKU	HARD DRIVE	PRICE
IBM			
Aptiva A52 Intel® P150MHz	12-10672	2.0 Gig	\$2899.92
Aptiva A92 Intel® P166MHz	12-10673	2.0 Gig	\$3099.92
AST			
Advantage!626 Intel® P133MHz	12-10704	1.2 Gig	\$1999.99
Advantage!826E Intel® P150MHz	12-10709	2.1 Gig	\$2599.99
Advantage!828 Intel® P166MHz	12-10710	2.1 Gig	\$2899.99
Packard Bell			
Force 3570 Intel® P100MHz	12-10686	1.08 Gig	\$1299.99
Force 4650 Intel® P120MHz	12-10688	1.08 Gig	\$1599.99
Platinum X Intel® P150MHz	12-10690	1.6 Gig	\$2299.99
Platinum XXII Intel® P166MHz	12-10693	2.0 Gig	\$2799.92

MONITORS SOLD SEPARATELY

MONITORS

DESCRIPTION	SKU	PRICE
Pixie		
14" Super VGA Monitor	32-10257	\$239.99
15" Super VGA Monitor	32-10258	\$319.99
17" Super VGA Monitor	32-10308	\$599.99
U.S. Logic		
14" Super VGA Monitor	32-10264	\$199.99
15" Super VGA Monitor	32-10265	\$319.99
17" Super VGA Monitor	32-10266	\$349.99
SONY		
15" Super VGA Monitor	32-10305	\$449.99
20" Super VGA Monitor	32-10304	\$1899.99
HITACHI		
17" Super VGA Monitor	32-10310	\$699.99
21" Super VGA Monitor	32-10312	\$1899.99
NEC		
15" Super VGA Monitor	32-10320	\$499.99
17" Super VGA Monitor	32-10319	\$819.99

LASERJET 5L**HEWLETT®
PACKARD****\$479⁹²**

- 600 x 600 dpi black
- Up to 4 ppm print speed
- 1MB RAM, expandable to 9MB
- 26 scalable typefaces
- Instant-on fuser eliminates warmup time
- One-year Instant Exchange warranty

#36-10492

PRINTERS AND SCANNERS

DESCRIPTION	SKU	PRICE
Canon		
BJC 210	97-10123	\$199.92
BJC-4100	97-10114	\$299.92
DeskJet 340(notebook compatible)	91-10118	\$299.99
Optional color kit for the DeskJet 340	91-10045	\$39.99
DeskJet 600C	97-10106	\$239.99
DeskJet 660C	97-10088	\$339.99
DeskJet 660CSE	97-10116	\$299.92
WE CARRY THE FULL LINE OF NEW HP PRINTERS. CALL FOR DETAILS.		
OKIDATA		
OL 810E	36-10487	\$789.99
LEXMARK		
Optra R+	36-10494	\$1399.99
EPSON		
Stylus Color IIS	97-10112	\$219.99
Color Stylus II	97-10111	\$299.92
HEWLETT® PACKARD		
ScanJet 4S(notebook compatible)	37-10167	\$319.99
ScanJet 4C	37-10166	\$999.99

*PRICING EFFECTIVE 5/1/96

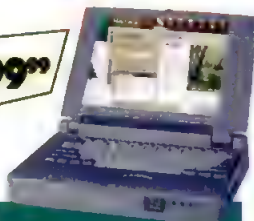
1-800-THE-CITY**1-800-843-2489**FIND US ON
THE INTERNET AT<http://www.Tandy.com>**COMPUTER**In Touch With Tomorrow
TOSHIBA**415CS NOTEBOOK**

- Intel® Pentium® processor 90MHz
- 8MB RAM, expandable to 40MB
- 810MB hard drive
- 11.3 dual-scan color display

#23-10295

Quad-speed CD-ROM

for 405/415(24-10289)\$299.99

\$3199⁹²**NOTEBOOKS**

DESCRIPTION	SKU	PRICE
TOSHIBA		
405CS Intel® P75 MHz	23-10288	\$2699.99
Portege 610CT Intel® P90MHz	82-10038	\$3999.99
Quad-speed CD-ROM for 405/415	24-10289	\$299.99

CALL FOR THE LATEST PRICING!**\$1999⁹²**

In Touch With Tomorrow

TOSHIBA**T-105CS NOTEBOOK**

- Intel® Pentium® processor 75MHz
- 8MB RAM, expandable to 40MB
- 528MB hard drive
- 10.4" dual-scan SVGA color display
- Integrated AC adapter
- Integrated pointing device
- NiMH battery
- One type III PC card slot

#23-10297

Battery for T-105CS(24-10325).....\$119.99

CALL FOR A HUGE ASSORTMENT OF BATTERIES, CHARGERS AND ADAPTERS**IDE HARD DRIVES**

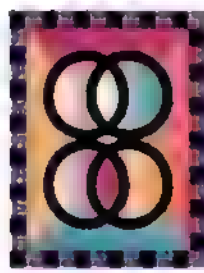
	CAPACITY	ACCESS	FORM FACTOR/ HEIGHT	RPM	CACHE	SKU	PRICE
Seagate	1.2GB	10ms	3.5"1"H	4500	256K	19-10377	\$239.99
WESTERN DIGITAL	1.2GB	10ms	3.5"1"H	4500	64K	19-10355	\$249.99
WESTERN DIGITAL	1.6GB	9ms	3.5"1"H	5200	64K	19-10366	\$299.99
Seagate	2.1GB	10ms	3.5"1"H	5200	128K	19-10374	\$329.99
WESTERN DIGITAL	2.1GB	10ms	3.5"1"H	5200	128K	19-10378	CALL
WESTERN DIGITAL	2.5GB	10ms	3.5"1"H	5200	128K	19-10379	CALL

HOTTEST SELLING SOFTWARE

GAMES	BUSINESS
60-14555 X-Wing Collection \$24.99	57-10316 Netscape Navigator 2.0 \$39.99
60-15011 You Don't Know Jack \$29.99	76-10523 Microsoft Plus CD \$39.99
60-14967 Monopoly \$34.99	76-10522 Microsoft Plus 3.5 \$39.99
60-15077 Warcraft II \$39.99	76-11515 Quarterdeck QEMM 8 upgrade \$39.99
60-15182 Descent II \$49.99	76-11516 Quarterdeck QEMM8 \$69.99
60-15014 DIG CD \$39.99	61-10064 Windows®95 3.5 upgrade \$89.99
60-15129 Mechwarrior II \$39.99	61-10065 Windows®95 CD upgrade \$89.99
60-12501 Myst \$44.99	43-10287 MS Bookshelf \$49.99
60-14839 Command & Conquer \$44.99	43-10189 MS Encarta 96 \$49.99
60-14766 SIM City 2000 \$49.99	71-10698 88 Million Household \$14.99
60-15083 The Beast Within \$54.92	43-10195 Street Atlas \$59.99
60-14836 Phantasmagoria \$49.99	43-10208 Mavis Beacon Typing \$39.99

CALL FOR THE LATEST PRICING!

Prices and item availability are subject to change without notice. Photos or renderings may not represent actual product. Although we want our catalog to be accurate, mistakes occasionally happen. If you have any questions, please call 1-800-THE-CITY. U.S. Logic and Computer City are registered marks of Tandy Corporation. All other marks identified herein are the trademarks of our vendors. The products in this ad were selected for in advance of this offering; therefore, situations may occur where some products may not be available. Most merchandise comes with a full manufacturer's limited warranty. Warranty information available prior to sale upon request by calling 1-800-THE-CITY or by writing to Computer City Direct, 2000 Two Tandy Center, Fort Worth, TX 76102. RETURN POLICY: RETURNS CANNOT BE ACCEPTED AT COMPUTER CITY RETAIL STORES. Before returning any product, you must call 1-800-843-2489 for a Return Merchandise Authorization (RMA) number. Return authorization numbers are required for any return. Packages without an RMA# will not be accepted. Most unopened product may be returned for a refund, excluding shipping or delivery charges within 15 days or less. If merchandise is returned within 15 days, but is not returned in new or resalable condition, there will be, except where disallowed by local law, a 15% (of original price) restocking fee, plus the cost of any necessary replacement parts, accessories, warranty cards, instructions, etc. Non-returnable merchandise is: Merchandise/software returned more than 15 days from the date the merchandise was received; opened software and Laser printers and fax machines if toner has been installed.



PC Tech/Inside OS/2

By Linden deCarmo

Creating a Multimedia CD Player Using REXX

Unleash the dormant multimedia capabilities of your machine.

REXX is the grand conductor of OS/2; it is responsible for orchestrating most aspects of your computer system. While certain topics, such as programming the Workplace Shell with REXX, garner most of the publicity, few people realize that it can be used to control all of the multimedia power in your computer. In this series, we will examine the inner workings of the multimedia support in REXX and use it to unleash the dormant multimedia capabilities of your machine with a full-function CD player (Figure 1), multimedia jukebox, and wave-effect player.

For years, REXX was irrelevant to multimedia users, because the designers of OS/2 multimedia did not intend for its functions to be accessed by casual users. Rather, it was targeted at advanced programmers who were adept at using C and C++. To ease debugging, these designers included a feature called the string interface, which enabled OS/2 to be controlled with English commands. This string interface interprets English statements or strings and turns them into multimedia actions. Although this interface has existed since OS/2 2.0, it lay dormant until REXX support for the string interface was added to OS/2 2.1. The marriage of REXX with the string interface is ideal, because the string interface hides the complexity of the multimedia from the average REXX programmer while still supporting the vast majority of multimedia functions.

THE STRING INTERFACE

The string interface uses a relatively simple grammar (or language), which generally follows the syntax:

```
< command > { alias } { notifications }
-> { command specific options }
```

Items within angle brackets (<>) are required, and those within curly braces ({}) are optional.

The first item in the string interface grammar is a command. Commands are used to inform the system of the action you wish to perform. Some common multimedia commands are open, load, close, seek, rewind, play, record, save, cut, copy, and paste.

The second item in the string interface is an alias, which is a nickname for a multimedia file; it allows you to use a few short letters rather than having to type out a cumbersome filename (like c:\users\florida\broward\ftlauderdale\beach.wav). If you don't use an alias, the filename (or element) must be substituted in its place.

The third item in the string interface is the notification option. Every string can have either wait or notify attached to it, though neither is required. When you use the wait option, the command is performed on the same thread as your REXX program, with the result being that your application can't continue until the multimedia function com-

pletion thread). Notification, however, will not be sent to an application when the function completes. So if you use notify or do not add wait when using REXX, you'll have to poll the system to determine when the command is completed (we'll discuss this in more detail later).

Here's a small sample using two string interface commands:

```
open cdaudio alias cd wait
play e:\booboo.wav wait
```

The first opens an audio CD and gives it the alias CD. The second command plays the .WAV file BOOBOO.WAV located on the E: drive using the wait option.

The final items in the string interface grammar are the options, which vary among commands. For instance, you can use the play command to listen to a specific portion of a CD via the play options. The play command has the following syntax:

```
play < alias > { from [ pos ] }
-> { to [ pos ] }
```

While the overview above gives you a brief introduction to the string interface, it is definitely not a complete description of the language's syntax. You'll want to refer to the basic multimedia REXX primer in the Multimedia Folder on your desktop. And for a comprehensive listing of all the string interface options, please see the Multimedia Programmer's Reference, which is part of Developer's Connection for OS/2 CD.

LOGICAL DEVICES

Before moving further into multimedia REXX, you need to understand what a logical multimedia device is and how you can control it. OS/2 insulates your REXX applications from the complexities of sound, video, and other hardware by interposing a driver between the hardware and your program. This driver is the logical device your REXX program calls, and it in turn talks to the sound card or video display in your machine. Because your program doesn't need to know the intimate details of how to control specific multimedia devices (such as a Sound Blaster card or a Sigma

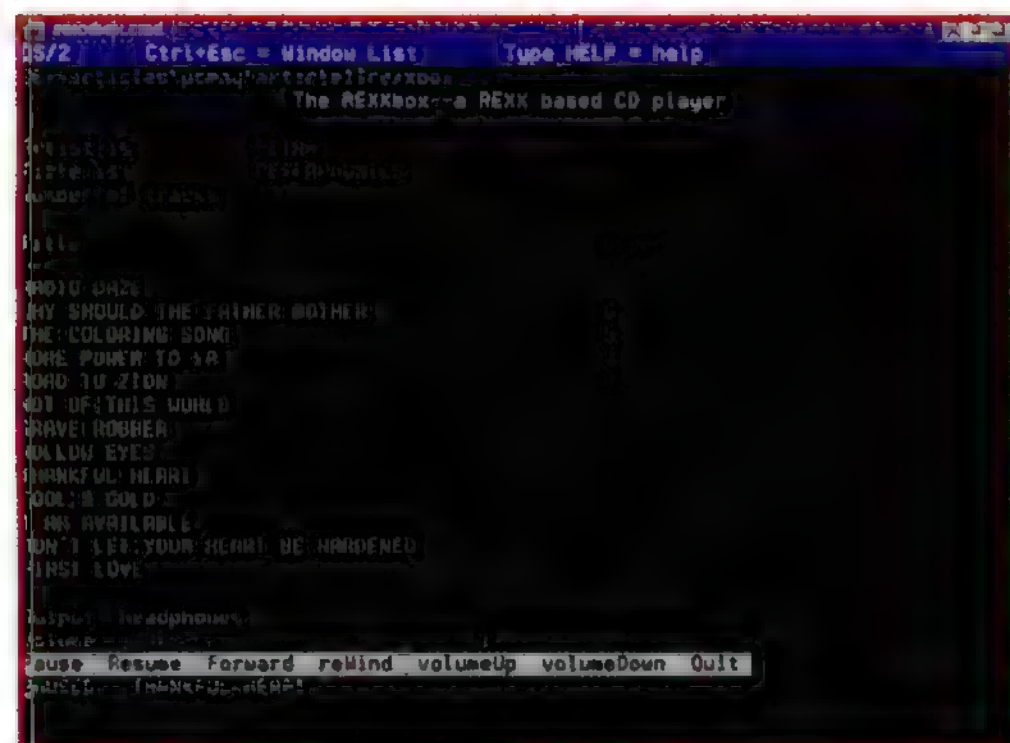


FIGURE 1: Our REXX-based multimedia CD player doesn't have a pretty face, but it offers all of the normal CD functions.

pletes. By contrast, if you use notify, the function may execute on a different thread. After the command is finished, OS/2 will send notification of its completion to the program's message queue. Thus, unless your program has a message queue, you should avoid using notify with REXX.

If you send a command and don't use wait or notify, the system treats the command as if you used the notify option (that is, the command may or may not be performed on the appli-



Introducing another new product that will
take the country by storm.

Boxlight's newest multimedia projector, the Revolution, is all the rage. Just plug your laptop or VCR into the projector, and that's it. Your bright, bold presentation is up on the wall and you and your work look great. Changes are simple, you can make them as you go. Audio, video, cable and TV can be part of any presentation. And you'll never, never have to use, make or even look at slides and transparencies again.

You have to try it.

When you see the Revolution, you'll know it's different from other personal projectors. It's less than 11 pounds, so it's easy to carry. It's brighter than products twice its size. Yet it costs thousands of dollars less, that's right, less, than other projectors. You'll absolutely love it.

Go on, try it.

Just pick up the phone, dial 800-532-7904, and get your very own Boxlight through our no-risk trial offer. Once you try it, you'll just never want to stop.

**The best personal
projector ever.**

Exclusively from Boxlight.

The Revolution. Thousands

of dollars less than other

projectors, yet better. Mac,

PC, SVGA, VGA compatible.

9"x 6"x 13" and only 10.9 lbs.

True 800 x 600 pixels. Very

bright, 200-300 ANSI lumens.

16.7 million colors. Expansion

slots. Optional tuner for

cable and TV broadcasts.

Loves Windows® 95. 30-day

money-back guarantee.

You can purchase, rent or

lease a Boxlight. Or visit

<http://www.boxlight.com>.



To try one, or at least find out about it, call 800-532-7904

BOXLIGHT
CORPORATION

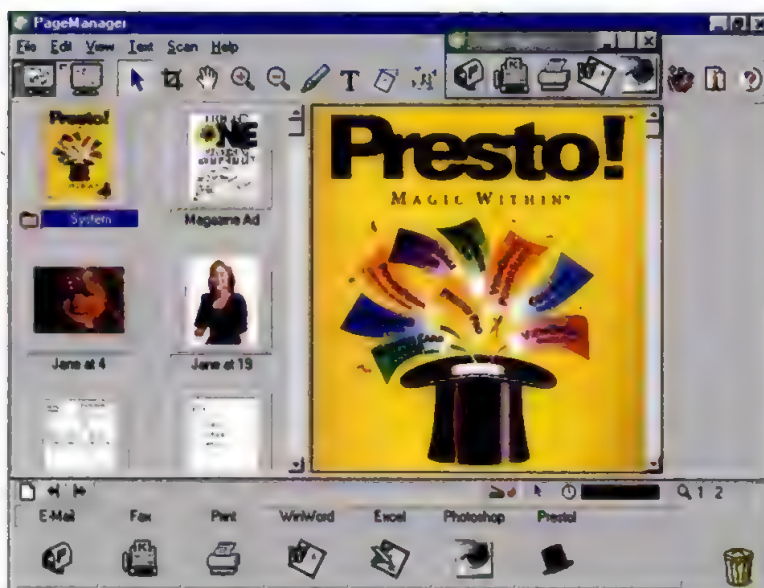
Free Software!*

Presto! PageManager

The Manager for Your Documents, Scanner & Applications

Scan It!

Click once to scan and store photos or paperwork.



File It!

Save what you're working on in an electronic file cabinet with text search tools.

Print/Copy It!

Just Drag and Drop to print, copy, or edit what you scanned.

Mail It!

Once you scan, you can send your image over electronic mail without leaving the application!

Other Features!

Presto! PageManager offers Text Annotation, Image Editor, Text Editor, and Built-In OCR.

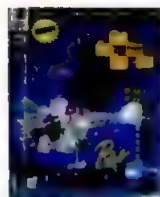
Drag & Drop It!

Drag and Drop documents to MS Word, Excel, Adobe Photoshop, Corel Draw, Presto! Pro, ViewOffice PowerSuite, etc.

Fax It!

With Presto! PageManager, you don't need a stand-alone fax machine. Just scan your pages straight to your fax modem!

Other Presto! Products:



Presto! Pro



ViewOffice
PowerSuite

Call Today for Your **FREE*** Software!

800-670-7266

OR

Download Presto! PageManager & Other Presto! Products**

<http://www.tophat.com>



Available at: Babbages, Computer City, Doppler, Elek-Tek, Fry's Electronics, J&R Computer World, Software Etc.

* There is a non-refundable \$9.95 (US) or \$19.95 (Canada) shipping & handling charge. Outside US 510-252-0267. ** There is a non-refundable \$4.95 charge to download from the Internet. Please have your Visa, Mastercard, or American Express card ready when you call. One copy per household. Offer good only in the US and Canada. Information and prices subject to change without notice.

© 1996 NewSoft Inc. Presto!, Magic Within, and all other Presto! Products are trademarks of NewSoft Inc. All other product names are trademarks of their respective companies. All rights reserved.

CIRCLE 078 ON READER SERVICE CARD


```
rc = mciRxSendString("capability supercd can eject wait", 'Retst', '0', '0')
If (Retst='TRUE') Then
    say 'CD can perform software ejection'
rc = mciRxSendString("capability supercd can lockeject wait", 'Retst', '0', '0')
If (Retst='TRUE') Then
    say 'CD can prevent manual ejection of the CD'
```

FIGURE 2: Checking whether the CD can be ejected via software. Other capabilities can be similarly queried.

Design MPEG card), it can run on all machines supported by OS/2.

Logical devices also have the ability to be used (or shared) simultaneously with multiple applications. But in order for these devices to be shared, OS/2 must be able to send notification messages to your application to alert it when another program either takes the device away from you or returns it. Since these messages can only be sent to a message queue, most REXX programs cannot participate in device sharing. As a result, the typical REXX multimedia application opens the logical device in exclusive mode and prevents other programs from accessing the driver while it runs. We will explore the ramifications of using a multimedia driver in exclusive mode near the end of this article.

OS/2 includes four logical multimedia drivers: CD Audio, Digital Audio, MIDI, and Digital Video. The CD Audio device is used to control music CDs. The Digital Audio device is responsible for playing and recording digital audio (or .WAV) files. The MIDI and Digital Video devices play Musical Instrument Digital Interface (or .MID) and motion video (.AVI, .MPG) files, respectively. There are a number of other third-party multimedia devices available, but in this article I will focus only on those that are built into OS/2.

Typically, you take the following steps to use each OS/2 multimedia device:

- Open the device via the string command OPEN.
- Prepare the media via the LOAD, REWIND, or SEEK commands.
- Perform actions (such as PLAY and RECORD).
- Close the device with the CLOSE message.

The MCIAPL.DLL lets you access each logical device installed in your system. This .DLL exports a series of functions that allow users to send English commands to OS/2 via REXX. To use this support, you first link your REXX program to OS/2 with the RXFUNCADD call. Once the MCIAPL.DLL has been loaded, you initialize it via the mciRxInit() call.

```
rc = RXFUNCADD('mciRxInit', 'MCIAPL',
    'mciRxInit')
InitRC = mciRxInit()
```

After MCIAPL.DLL has been loaded and initialized, you can start firing multimedia commands at OS/2.

CREATING THE REXXBOX

Now we'll use REXX's powerful multimedia capabilities to create the core of a programable CD player: the REXXbox, which contains volume control, playlists (or track control and setup), and digital transfer capabilities.

To control the REXXbox, we'll first create an alias for the device via the open command:

```
rc = mciRxSendString("open cdaudio
    alias supercd wait", 'Retst', '0', '0')
```

We'll use the alias SUPERCD for all commands for this player. Then we'll interrogate

```
/* Open the CD */
rc = mciRxSendString("open cdaudio alias supercd wait", 'Retst', '0', '0')
rc = mciRxSendString("status supercd media present wait", 'Retst', '0', '0')
If Retst <> 'TRUE' then
    do
        say 'Must have CD inserted to run this command file'
        say 'Please insert'
        rc = mciRxSendString("status supercd media present wait", 'Retst', '0',
            '0')
        do while Retst <> 'TRUE'
            rc = mciRxSendString("status supercd media present wait", 'Retst',
                '0', '0')
            End
        End
rc = mciRxSendString("info supercd id wait", 'Retst', '0', '0')
say 'The unique identifier for this CD is ' Retst
say 'Use this information to save playlists and other setups'
rc = mciRxSendString("close supercd wait", 'Retst', '0', '0')
```

FIGURE 3: Using REXX, an example of how to determine if a CD is in the drive and also to figure out the unique product identifier associated with the CD.

the device to figure out what its capabilities are; it's essential to query the capabilities of a multimedia device before starting to use it, both to avoid unsupported functions and to take advantage of specific hardware features.

The first thing the REXXbox does is determine the manufacturer of the CD drive via the info < alias > product command:

```
rc = mciRxSendString("info supercd
    product wait", 'Retst', '0', '0')
```

This information can then be used to work around hardware bugs and peculiarities. For instance, suppose you know that a certain CD drive cannot play CDs with more than 15 tracks (or songs). If the info command indicates that the REXX program is running on the problem hardware, you may want to alert the user that he or she will not be able to play CDs with more than 15 tracks. You can also use this command to take advantage of hardware specifics. For example, if Joe's Basement CDs hires you to write a REXX program to ship with its CD-ROM drive, you can use the command to ensure that your program works only on Joe's hardware and not on his competitors' drives.

After you've determined the drive manufacturer, you should query the device about additional capabilities (Figure 2). For example, the REXXbox asks the device if it can eject the CD via software and whether it can disable manual ejection of the CD. Other capabilities, such as whether the CD supports volume control and whether it can perform a digital transfer of audio data directly from the CD to the computer system's sound card, can be queried in a similar manner. While these steps may not seem necessary, they're vital if you want your program to run smoothly on other people's machines.

The next action the REXXbox will per-

form is to figure out which artist or artists recorded music on the disk in the CD-ROM drive. You use the status command to find out whether a CD is currently inserted into the drive and, if it is, the info < alias > ID to determine the unique product identifier (or ID) associated with the CD (Figure 3). With this unique ID, we can allow the user to save information associated with the CD for future reference. You may be wondering why we can't simply query the system to deter-





The new PictureTel Live200 series with LiveWare makes videoconferencing easy. Designed for Windows 95, these systems are so intuitive, there's almost no learning curve. With PictureTel's Live200 series, you get a "plug-and-play" system that has everything you need: Data conferencing software, color camera, headset, microphone, speakers, PC boards and cables. Plug in and get started!



PictureTel offers the only data conferencing tools in the industry guaranteed to be fully compatible with Microsoft's.

PictureTel's new Live200 series with LiveWare makes video and data conferencing so affordable, you'll do a double take. Streamline communications with distant customers and colleagues. Share applications with or give presentations to a colleague who is miles away. It's the fastest, most cost-effective way to collaborate with clients and customers anywhere. Harness all the power and potential of videoconferencing in the blink of an eye—PictureTel Live200 series with LiveWare.



Call PictureTel now for price information and details on our full product line from affordable desktop PC systems to room-based videoconferencing!

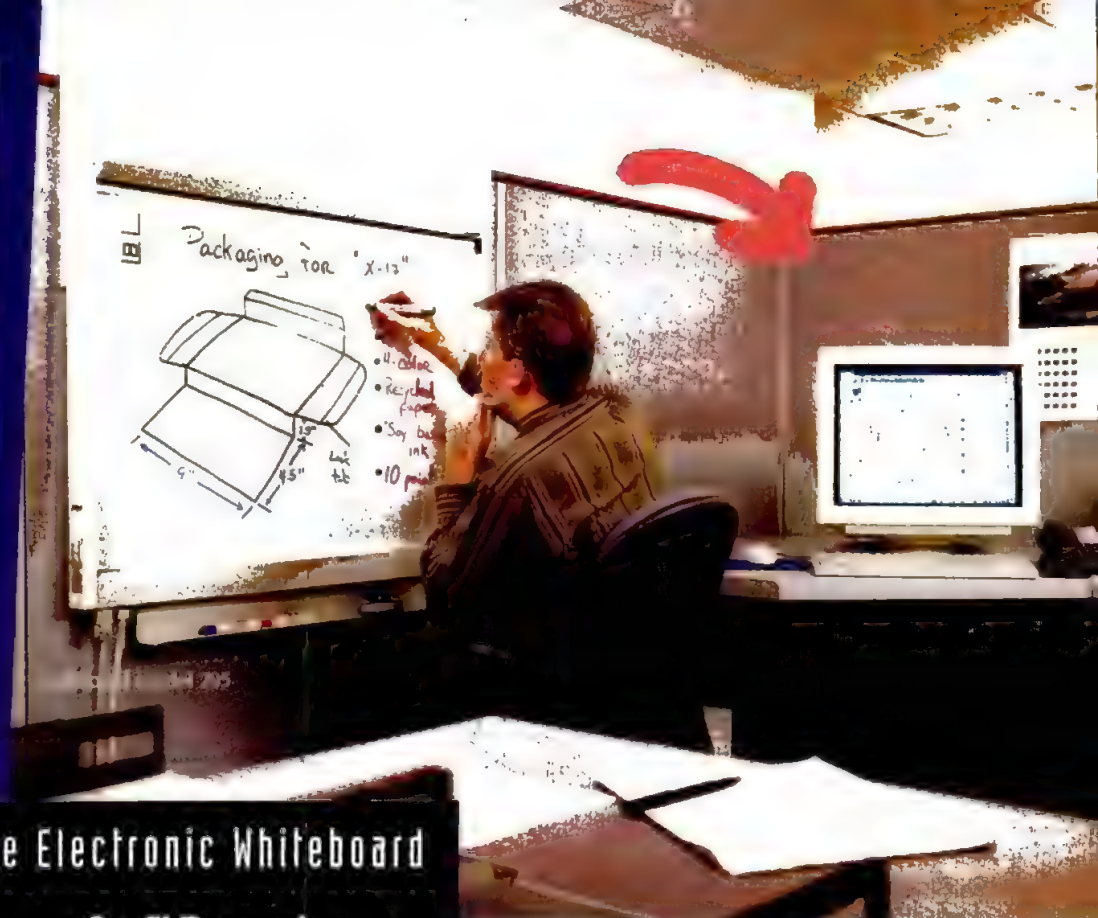
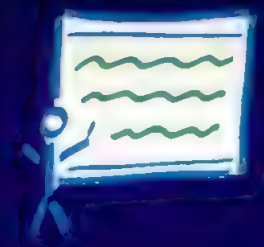
[800] 760-1770

<http://www.picturetel.com>



PictureTel

See us at PC Expo, Booth #2954



The Electronic Whiteboard

SoftBoard

For Windows & Macintosh

**Imagine the project where
you all have the same vision,
the same objectives, and the
same notes.**



Mobile SoftBoard model 203



SoftBoard model 201 using
SBRremote conferencing software

SoftBoard® only *looks and feels* like an ordinary whiteboard. Whatever you create on a SoftBoard appears instantly on your Windows™-based PC or Mac®. Once it's there, you can save it, print it, cut and paste it, e-mail it, fax it, even network it to multiple sites. Use SoftBoard in collaborative discussions and brain-storming sessions. You can share information, create new ideas and keep records without tedious transcribing.

From personal to conference room sizes, wall or cubicle mount, table top, or mobile, there's a SoftBoard to fit your needs: model 201, a full-size wall mounted version; model 203, integrated with a rolling stand; and model 205, a personal size version for your office wall, table top, or cubicle.

For our brochure and information on all our SoftBoard models call **1-800-334-4922** today.

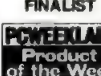
SoftBoard

M I C R O F I E L D



Microfield Graphics, Inc.
9825 SW Sunshine Court
Beaverton, OR 97005
503-626-9393, Fax 503-641-9333
e-mail: sb_info@mfg.com

Visit our web site!
<http://www.softboard.com>



Tele
conference
The Business Conference series recognizes
THE MOST INNOVATIVE AND ADVANCED IN
AN INDUSTRY OR COMPANY'S
CONFERENCE

```

loop = 1
trackstring = 'status supercd length track'
rc = mciRxSendString("set supercd time format ms wait", 'Retst', '0', '0')
rc = mciRxSendString("status supercd number of tracks wait", 'Retst', '0', '0')
NumTracks = Retst
rc = mciRxSendString("status supercd length wait", 'Retst', '0', '0')
do while loop <= NumTracks
    trackcommand = trackstring loop ' wait '
    rc = mciRxSendString(trackcommand, 'Retst', '0', '0')
    TimeInSecs = Retst / 100
    say 'Track ' loop ' is: ' TimeInSecs ' seconds'
    loop = loop + 1
End

```



FIGURE 4: This listing illustrates how you can determine the total playing time of the CD, the number of tracks on the disk, and the length of each track.

```

rc = mciRxSendString("set supercd time format tmsf wait", 'Retst', '0', '0')
seekcommand = 'seek supercd to' track ' wait'
rc = mciRxSendString(seekcommand, 'Retst', '0', '0')
/* calculate time offsets from the beginning of the track */
/* use milliseconds since its easier to determine time offsets in this */
/* rather than converting a track offset into a time unit */
rc = mciRxSendString("set supercd time format ms wait", 'Retst', '0', '0')
rc = mciRxSendString("status supercd position wait", 'time', '0', '0')
rc = mciRxSendString("play supercd ", 'Retst', '0', '0')
maxtime = maxtime + time
/* loop until the desire number of milliseconds have passed */
do while time < maxtime
    rc = mciRxSendString("status supercd position wait", 'time', '0', '0')
END

```

FIGURE 5: This listing illustrates setting the time format and using the seek and play commands, as well as polling the CD driver to determine when playback is finished.

mine the artist's name and the title of each song on the CD. Unfortunately, this isn't possible, because CD products in the current generation don't have standardized mechanisms for storing this information. Even if they did, OS/2 does not provide an API to access such a mechanism.

Besides showing how to identify a CD, Figure 3 also illustrates the technique of defensive multimedia programming—that is, the ability of the program to respond to catastrophic events, such as the user ejecting the CD while the program is running. Rather than simply failing when there is no CD in the drive, our example informs the user that there must be an audio CD in the drive and then politely waits until a disk is inserted before continuing.

After determining the basic facts about the disk, we can interrogate the CD Audio driver to discover additional details about the CD in the drive. For instance, Figure 4 shows how you figure out the total playing time of the CD, the total number of tracks on the disk, and the length of each individual track. We'll use this information later on when we're controlling playback.

Once you've obtained a large inventory of

information, you can prepare the device for playback. This process involves determining the timing system you want to use, utilizing the seek command to position the device where you want to start playing music, figuring out how the user will hear the music, and calculating how long you will let the CD play.

Before you can play, search, or stop the CD, you need to inform OS/2 of the time format you'll be using when commands are issued. To explain, most commands (such as play or seek) have the option of using a time duration, which lets you control the amount of time that the command will be active (that is, the amount of time that the CD will play or the amount of time that the seek command will skip over). By default, OS/2 uses a time system called MMTIME (each MMTIME unit is approximately 1/3,000 of a second). This time format is adequate for video devices, but there are more appropriate formats for CDs. You may find it more convenient to use ms (milliseconds) or TMSF (for tracks, minutes, seconds, and frames). Figure 5 shows an example of setting the time format. The REXXbox uses TMSF, because this format allows you to count time from the beginning of each track (or song) on the disk and makes

track-based time calculations considerably easier.

After you've determined the correct time format, you have to figure out where the audio from the CD will be heard. OS/2 defaults to sending the output from the CD either to the front panel jack or through the audio connector pins on the CD.

Unfortunately, if your CD-ROM is very inexpensive or if you can't enable the audio mixer for your sound card, the sound quality may be poor. To work around this problem, OS/2 allows users to stream audio from the CD—that is, to send digital data directly from the CD to a sound card. Use the following command to enable digital transfer (assuming it is supported):

```

rc = mciRxSendString("connector
=>supercd enable type cd stream wait",
=>'Retst', '0', '0')
rc = mciRxSendString("play supercd ",
=>'Retst', '0', '0')

```

This method lets the sound card convert the digital audio data to an analog waveform you can listen to. This solution can yield much higher fidelity, but it does have one significant drawback: It is extremely processor-intensive. As a result, you should not enable this option by default; enable it only when users request it.

Now we're ready to locate the position where to start playback via the seek command. When you arrive at the starting position, you can then use the play command to start the music (Figure 5). The play command supports two optional parameters: FROM and TO. FROM lets you indicate the point in time on the CD where to start playing, and TO lets you tell OS/2 the point in time where to stop playing. You can use the FROM and TO options to play entire tracks or portions of a track at a time.

If you issue the play command with the wait option, OS/2 will use your program's thread to execute the command. As a result, your application will not be able to do anything else (such as update the user interface or decrement the time remaining in the track) until the play command completes. To allow interaction with users during playback, the REXXbox doesn't use either wait or notify when issuing the play command (this forces OS/2 to use a different thread for playing the CD). Since we aren't using the wait option, we must continually poll OS/2 to determine when the play command completes (see Figure 5 for an example of how to poll for playback completion).

While the CD is playing, the REXXbox lets users increase or decrease volume settings with the set command. The following commands illustrate conventional audio-level control:

Simply Sensational.



Visual Sensations...

What would you call a multimedia monitor series with the best price/performance ratio in the industry? What if it included a 17-inch (15.9-inch viewable diagonal) model with powerful, high-quality integrated speakers, a crisp .28mm dot pitch, OSD digital controls, and the lowest price around?

We call it our *Visual Sensations™* Series. The most feature-sensible, cost-effective monitor family available.

Call today for more information. Once you see our *Visual Sensations* Series, you'll agree it's simply sensational.

For full product information check out our web site at <http://www.kdsusa.com>,
For faxed documents, call our Fax Back service at (800) 551-2589.

CIRCLE 170 ON READER SERVICE CARD

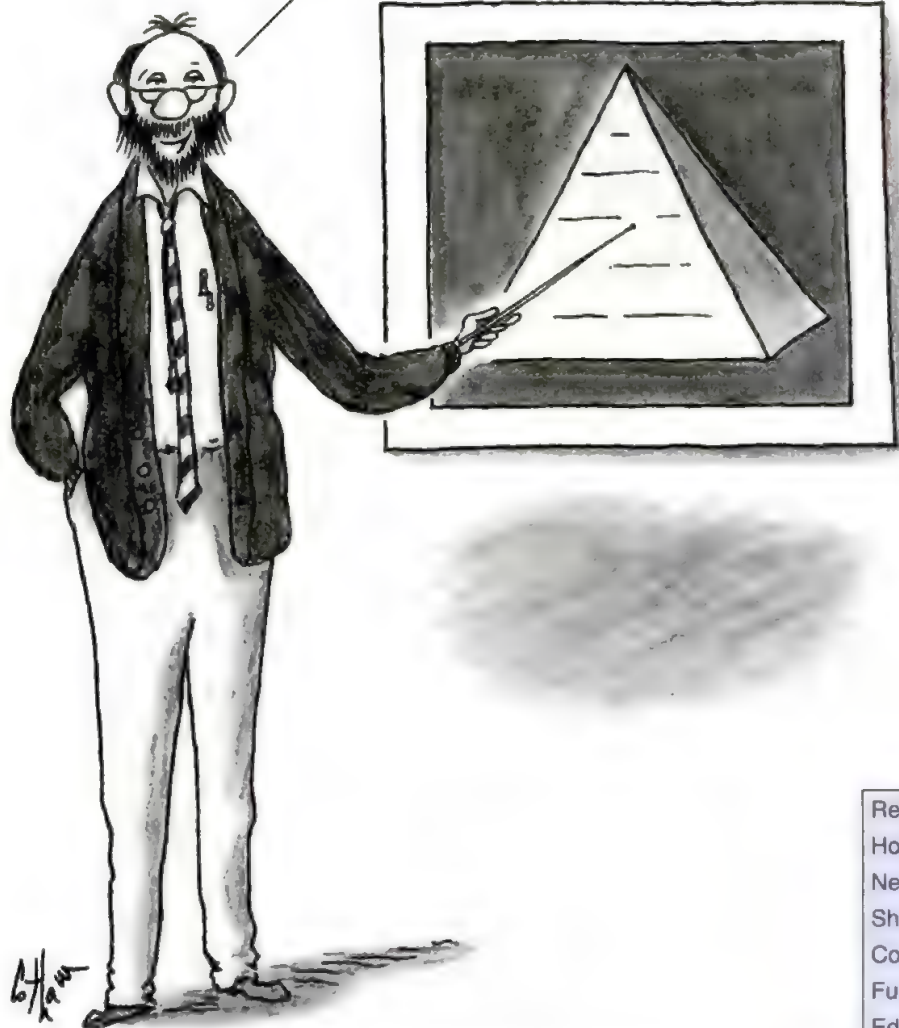
KDS

The Vision Of Price & Performance™

12300 Edison Way, Garden Grove, CA 92641
(714) 379-5599 • FAX (714) 379-5595

© 1996 KOREA DATA SYSTEMS CO., LTD.

"In today's class we'll be studying these pointy buildings that were built by those sweaty people in that really hot area."



Sometimes life calls for deeper answers ►

Reference
Home/Leisure
News
Shopping
Computers
Fun & Games
Education ▼

Science Math Forum
Academic American Encyclopedia
Petersons College Guide

Travel
Entertainment
Sports

If you thought all online services were the same, think again. For just \$9.95 a month, CompuServe gives you Internet access and more detailed information on the subjects you're interested in than any other online service. Because CompuServe has the strongest relationship with the best sources for news, sports and entertainment, you're always plugged in to *Fortune*, *Comedy Central* and *Entrepreneur*, just to name a few. Don't be left only half-informed ever again. Sign up today.

CompuServe®
1-800-487-4838

**FREE SOFTWARE
AND 10 FREE HOURS**


```
rc = mciRxSendString("play supercd", 'Retst', '0', '0')
keyin = SysGetKey('NOECHO')
SELECT
WHEN keyin = 'p' | keyin = 'P'
THEN
rc = mciRxSendString("pause supercd wait", 'Retst', '0', '0')
WHEN keyin = 'r' | keyin = 'R'
THEN
rc = mciRxSendString("resume supercd wait", 'Retst', '0', '0')
OTHERWISE
SAY "Sorry, but " keyin " isn't supported"

END /* End select */
```



FIGURE 6: Using the pause and resume commands with REXX.

```
rc = mciRxSendString("play supercd",
'Retst', '0', '0')
rc = mciRxSendString("set supercd
volume 90 wait", 'Retst', '0', '0')
```

You can also use the set command to close the door of the CD (if possible) or prevent users from ejecting the CD.

The REXXbox also allows users to pause, resume, rewind, and fast forward as it plays a CD. Figure 6 shows how you can use the pause and resume commands to create interesting effects during playback.

When you quit the REXXbox, it performs

one last step: It closes the CD device. It is vital that you close the device before quitting, because REXX programs typically do not open the device in shareable mode, and no other application can access the CD until the device is closed. Though it's true that OS/2 will automatically close the device on your behalf, this occurs only when the session terminates. If you run your program from a command window and don't perform proper cleanup, the device won't be closed until you exit the command window, resulting in a locked device that no other application can use.

Now that we've examined the core func-

tions available with the CD device, you are probably anxious to get your hands on the REXXbox source so that you can enhance it and start creating multimedia masterpieces. Space considerations prevent us from printing full example listings or, of course, the REXXbox source. But you can download the complete source code and the REXXbox from PC Magazine Online (see the sidebar "Guide to Our Utilities," in this issue's Utilities column, for instructions). The REXXbox was designed to be a full-featured program with many basic CD building blocks you can incorporate into your own REXX programs. Because the REXXbox is an example program, it isn't cluttered with code to support a pretty user interface. If you want a more user-friendly interface, enhancing the REXXbox in VX/REXX or VisiPro REXX would be an excellent project.

There's a lot more to explore in the multimedia support available with REXX. In the next installment, we'll investigate how you can create a cool wave player and a powerful REXX jukebox program that can play virtually any type of multimedia data. Also, we'll discover additional sources of multimedia REXX information. □

Linden deCarmo is a software engineer for Motorola in Plantation, Florida. You can contact him at lindend@ibm.net.

Cutting Edge Technology

More Powerful System with New 430HX Chipset

- PCI 2.1 Compliant-PCI Bus Speed to 132MB/sec
- Supports ECC Memory
- On-Board 256k Synchronous Pipeline Burst Cache (Upgradable to 512k)
- 8 to 512MB EDO RAM
- 4X32bit PCI & 4X16bit ISA Slots
- Socket-7 Processor Socket

Reliable

High Performance

On site Warranty

Network Solutions

Premier File/Server System



intel inside pentium

Mitsuba

1975 Wright Ave. La Verne, CA 91790

1(800)648-7822 • (909)392-2000

<http://www.mitsuba.com> • Fax: (909)392-2021

Hey!

Is this your copy of PC Magazine?



If not, call:

1-800-289-0429

to subscribe and get a FREE gift.



\$149

Move To New FreeHand 5 For Windows.

A powerful competitive upgrade offer! Only \$149 for current FreeHand users, as well as owners of Windows versions of CorelDraw, Deneba Canvas, Micrografx Designer, and Adobe Illustrator. A \$399*** value!



Get The Power Of FreeHand 5 With The FreeHand Graphics Studio.™

Macromedia's FreeHand Graphics Studio provides a complete set of tools for graphic design and illustration. FreeHand, the fastest and easiest illustration tool on the market. Extreme 3D™, the complete 3D modeling, animation, and rendering application. Fontographer®, the easiest way to create and modify fonts. And Macromedia xRes™ 2.0, the fastest editing, compositing, and painting tool for hi-res images. \$499***

COMPUTER *City*

1-800-THE-CITY

***Estimated street price. Reseller prices may vary. Macromedia reserves the right to substitute products in the Studios at anytime. Studio price good through September 30, 1996. Fontographer is a registered trademark and FreeHand, FreeHand Graphics Studio, Extreme 3D, and Macromedia titles, are trademarks of Macromedia, Inc. All other product names are registered trademarks or trademarks of their respective owners.
© 1996 Macromedia, Inc. All rights reserved.

Now FreeHand Makes It Easy To Drag & Drop Corel.



10,000 Quality Clip Art
Images & 500 Fonts

500 Quick Start
Templates!

Opens CorelDraw Files

Native 32-Bit, It Runs on
Win 3.1, Win NT, and Win 95

Move To FreeHand™ 5 For Only \$149.

Now there are 500 great reasons to move to FreeHand.

We call them Quick Starts. 500 easy templates that help you create everything from business cards to letterhead to newsletters. You just drop in your own text, and you're ready to go.

Of course, there are plenty of other reasons to go with FreeHand. Because FreeHand gives you all the desktop publishing and graphic design power you need with powerful illustration tools, multiple page layout, text control, and a superior drag & drop interface. And let's not forget FreeHand's reliable PostScript® printing and crash-free performance, which you simply can't count on with CorelDraw.

Best of all, you can pick up FreeHand for just \$149.* And there's no need to

worry about all your existing CorelDraw 3, 4 or 5 files, because FreeHand reads those, too. Then if you're still not convinced that FreeHand beats CorelDraw (or makes your life easier), you'll get your money back. Guaranteed.

So drop what you're doing with CorelDraw. And do it better with FreeHand.

30-Day Money Back Guarantee!
Call 1-800-945-9361*

<http://www.macromedia.com/>

	FreeHand 5	Corel 5/6
500 Quick Start Templates	Yes	No
Integrated Page Layout/Text Tools	Yes	No
Reliable/Crash Proof	Yes	No
High-Quality PostScript Printing/Output	Yes	No
PC Computing 1996 Rating	5 Stars	4 Stars
Great Value For Your Money	Only \$149	\$229-\$359

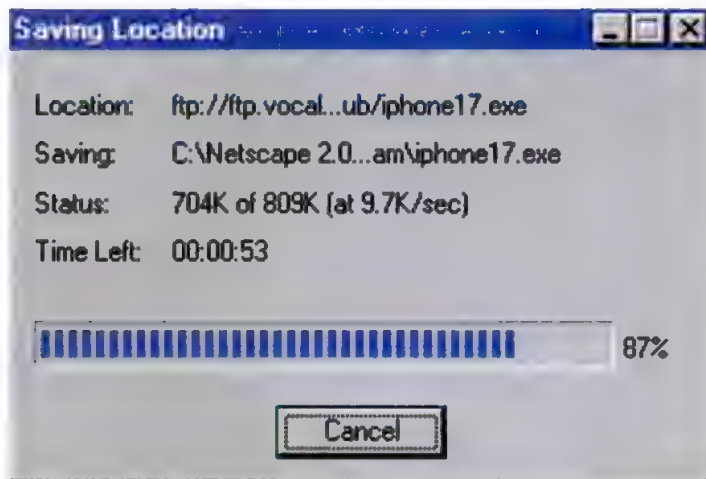


MACROMEDIA®

Tools To Power Your Ideas™

*Outside the U.S., Canada and Europe call 415-326-2000 or FAX us at 415-326-0954. In Europe call +44-(0)-1-444-58600. For education resellers, call 1-800-376-2178. **Proof of FreeHand, CorelDraw, Demobase, and/or Adobe Illustrator ownership required. Current FreeHand users: call for the free template. Template offer valid for registered users of FreeHand Windows only; purchased after 4/1/96 thru 9/30/96; proof of purchase required. Macromedia and the Macromedia logo are registered trademarks and FreeHand and Tools To Power Your Ideas are trademarks of Macromedia Inc. All other product names are registered trademarks or trademarks of their respective owners. © 1996 Macromedia Inc. All rights reserved.

CIRCLE 072 ON READER SERVICE CARD



IN 53 SECONDS YOU CAN BE TALKING TO ANYONE IN THE WORLD. FREE.

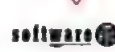
www.vocaltec.com/demo122.htm

Download a FREE demo of the award-winning Internet Phone today! There's never been a better time to try this breakthrough software from VocalTec. It's fully cross-platform compatible for Mac and Windows. So if you have Internet access, a standard multimedia computer and Internet Phone software, you can have a real-time, full-duplex voice conversation with anyone, anywhere in the world, who has the same setup. And it's FREE, except for your regular Internet access charges. Hard to believe? Come see for yourself.

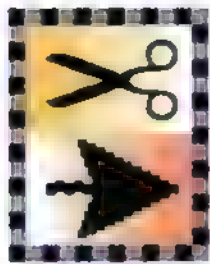
For more information on where you can get Internet Phone, call 201-768-9400, e-mail: info@vocaltec.com or stop by our Web site or one of the locations listed below.

PICK UP THE INTERNET PHONE

VocalTec, Internet Phone and Internet Phone Company are trademarks of VocalTec, Inc.



CIRCLE 052 ON READER SERVICE CARD



By Gregory A. Wolking

Explore Hotkeys in Windows 95

Hotkey Detective lets you manage hotkeys and find duplicates.

Remember the Shortcut Key feature in the Windows 3.1 Program Manager, which lets you press a key combination to launch a program? You may not realize it, but Windows 95 also has support for this type of hotkey, though it's quirky at best, buggy at worst, and poorly documented. (Apparently the people at Microsoft figured that if they couldn't get it right, they might as well downplay it.) In this article, I'll share what I have discovered about Explorer's implementation of hotkeys and give you a utility program that can help you use this feature effectively and avoid some of its bugs and pitfalls.

The most serious problem with hotkey support in Windows 95 is that Explorer, unlike Program Manager, does not prevent you from assigning duplicate hotkeys. The only clue you'll have of a duplicate assignment in Windows 95 is strange behavior: If you assign a hotkey and it keeps activating different shortcuts depending (apparently) on the phase of the moon or the color of your socks, you've got a duplicate assignment—*somewhere*.

Worst of all, Explorer provides no way whatsoever for you to display what hotkeys are in use and to what shortcuts they are assigned. To find duplicates, you must open the Properties page for each and every shortcut in your entire Start Menu folder tree and on your Desktop, then make a list of all the hotkey assignments you find—unless you have Hotkey Detective.

Hotkey Detective lists the hotkeys in use on your system, along with their associated shortcuts, and launches Explorer for you if you want to make changes. Because the list is sorted by hotkey name, any items with duplicate assignments will be grouped together. Hotkey Detective also provides an automatic refresh feature to keep itself up-to-date as you make changes, and it can print a list of your hotkey assignments.

You can obtain Hotkey Detective by downloading it from PC Magazine Online or by mail. (Refer to the sidebar "Guide to Our Utilities" for details.) The source code in Microsoft Visual C++, Version 4.0, can also be found online for those interested in seeing how it works.

USING HOTKEYS IN WINDOWS 95

Before discussing Hotkey Detective, I need to explain how to use hotkeys under Windows 95. I obtained much of the following information through my own experimentation and observation. Most of these features and behaviors are not documented, and what little documentation I have found ranges from virtually useless to completely wrong.

First of all, I should point out that Windows 95 uses the term *shortcut key* to refer to what everyone else in the industry calls a *hotkey*. I have chosen to stick to the traditional terminology, because the term *shortcut* is heavily overused in Windows 95 for many different

does a better job of maintaining its internal hotkey table when you make changes to your hotkey assignments.

Explorer's shortcuts appear in one of two forms. When you create a shortcut to a Windows executable file, a document, or a folder, Explorer creates a file with the extension .LNK. When you create a shortcut to a DOS executable file, Explorer creates a file with the extension .PIF. Note that there is no such thing as a shortcut to a .PIF file. While Explorer makes it appear that you can create such a shortcut, actually it creates a duplicate copy of the .PIF file and places it in the desired location. In other words, you'll never see a .LNK file that points to a .PIF file.

Explorer can assign a hotkey to almost any shortcut on your system. Explorer, however, will use a hotkey only if the associated shortcut is located either directly on your Desktop or somewhere within your Start Menu's folder tree. Hotkey Detective lists only the hotkeys that Explorer actually uses. Pressing an assigned hotkey launches or activates the corresponding shortcut no matter where you are in Windows—even when you're running a DOS application full-screen. This is a major improvement over Windows 3.1, in which Program Manager had to be the active window before a hotkey would launch a program. If Program Manager wasn't the active window, a hotkey could only activate a running application. Perhaps Microsoft took the hint from Douglas Boling's earlier *PC Magazine* utility HK.EXE (published in our issue of October 12, 1993), which added this functionality to Windows 3.1.

The only type of shortcut that can't be accessed with a hotkey is a DOS application that is configured to run in MS-DOS mode, since this mode requires shutting down all other applications and (in some cases) restarting your system. If you have configured an application to run in MS-DOS mode, its Shortcut Key selector field will be disabled.

To assign a hotkey to a shortcut, right-click on the shortcut and select Properties from its context menu. Click on the Shortcut tab (for Windows programs) or the Program tab (for DOS programs), then click on the Shortcut Key field. Press the key you want, then click the OK button. If you want to re-

IN THIS ISSUE

Hotkey Detective

Hotkey Detective lists the hotkeys in use on your system, along with their associated shortcuts, and launches Explorer if you want to make changes.



concepts related to both using Windows and writing Windows programs. In this article I use *shortcut* to refer to a file with the extension .LNK (or .PIF in the context of a DOS-based program) that Explorer uses to point to another program, document, or folder, and I use *hotkey* to refer to a combination of keys that Explorer uses to activate a shortcut.

Program Manager and Explorer are similar in that they both let you assign hotkeys to shortcuts (under Program Manager, shortcuts are called *program items*). Both shells implement hotkeys using an internal table to map each hotkey combination to a particular shortcut. But that is where the similarity ends. Program Manager's implementation is more robust in some important ways. It lets you use a wider assortment of key combinations than Explorer, and it's smart enough to prevent you from assigning the same hotkey to two different shortcuts. Program Manager also

move a hotkey setting, press Del, Spacebar, or Backspace after activating the Shortcut Key field.

This method also works to assign a hotkey directly to a DOS executable (.COM, .EXE, or .BAT) file. When you make such an assignment, Explorer automatically creates a new shortcut (.PIF) file, named "Shortcut to" followed by the original filename, in the same folder. For Windows applications, you must create the shortcut before you can assign it a hotkey.

You can get help for the Shortcut Key field by right-clicking on it, then selecting What's This? from the context menu. The resulting pop-up help message is useful in telling you how to assign a key but wildly inaccurate as to the rules for what key combinations are allowed. In fact, there are two completely different sets of rules, one for the .PIF files used by DOS programs and one for .LNK files used by Windows programs.

For .PIF files, you can use just about any key combination you want as long as it includes at least one of the modifiers Shift, Ctrl, or Alt. If NumLock is on when you're setting the assignment, you can use keys on the numeric keypad by themselves, without any modifiers at all. Don't go overboard, though, because some combinations can cause major headaches. For example, it is perfectly legal to assign Shift-A as the hotkey for a .PIF file. Unfortunately, that means every time you type a capital A using the Shift key, Explorer will intercept the keystroke and activate the corresponding shortcut. The important thing to remember is that once you assign a hotkey to a shortcut, that key combination becomes unavailable to *any* other program, even Explorer itself!

When you're setting the hotkey for a .LNK file, things get really weird. Unless the base key is on the numeric keypad and NumLock is turned on, Explorer tries to force the modifiers Ctrl and Alt. For example, pressing Ctrl forces Ctrl-Alt, as does pressing Alt alone. Explorer will let you assign the shift toggle keys (NumLock, ScrollLock, and CapsLock) as base keys, even though such combinations rarely work once assigned. About the only rule that seems to apply consistently is that your hotkey combination cannot include the Spacebar, Tab, Enter, Esc, PrintScrn, Backspace, or Pause keys.

Now we get to an actual bug: Explorer doesn't always update its internal hotkey table properly. In particular, removing a hotkey assignment doesn't always work. The hotkey you remove may become "ghosted" and continue to launch the associated shortcut until you either delete the shortcut entirely or restart the system. This bug interacts with Explorer's other shortcoming: It doesn't prevent you from assigning the same hotkey to more than one shortcut.

That's right—you could assign the same hotkey to every shortcut on your system. And it's nearly impossible to predict exactly which shortcut will be launched by a shared hotkey. Fortunately, HotKey Detective will reveal this error and allow you to correct it.

USING HOTKEY DETECTIVE

HotKey Detective consists of a single executable file, HKD.EXE. It requires no additional runtime modules or support files, so installation requires nothing more than placing the HKD.EXE file in the directory of your choice and optionally creating a shortcut for it in your Start Menu folder. It does not matter whether the directory you choose for installation is included in your system's PATH statement or not.

When you run HotKey Detective, it scans your Desktop folder and your entire Start Menu folder tree, extracting the hotkey assignments from each and every .LNK and .PIF file it finds. It presents an alphabetized list of the assignments it finds in the Key List box (see Figure 1). If it detects any duplicate hotkey assignments, it displays an appropriate message beside the box and selects the first of the duplicates in the list.

The Key List box serves two functions: to show you which shortcuts your hotkeys are associated with and to help you locate the shortcuts themselves. When you select a key name in the list, the fully qualified filename of the corresponding shortcut appears in the Shortcut Filename box at the bottom of the window. If the filename is too long for the text field, you can resize the dialog box and the controls will adjust themselves accordingly.

To change a hotkey assignment, you can double-click a key name, or you can select a key name and either click the Locate with Explorer button or press Enter. HotKey Detective then launches Explorer in dual-pane view, with the shortcut selected (and ready for editing) in the right-hand pane and the appropriate segment of the folder tree opened in the left-hand pane. Note that HotKey Detective launches a separate instance of Explorer every time you use this function. Therefore, you'll keep your screen much neater if you close Explorer after making a change and before using HotKey Detective to locate another shortcut for editing.

There are two reasons that HotKey Detective delegates the change function to Explorer rather than performing it internally. The first is that the structure of .PIF and .LNK files is not documented. It took me many, many hours of fiddling about with a binary editor to figure out how the hotkey information is stored, so it would be risky (not to mention foolish) to manipulate the files directly. The second reason is that even if I had known the

exact structure of the files and was positive that I could modify them without mishap, I couldn't get Explorer to reread the modified files and update its internal hotkey table. Delegating the changes to Explorer neatly solves both difficulties.

As soon as you complete the editing process and Explorer writes the updated .PIF or .LNK file to disk, HotKey Detective sees the change to your file system and automatically rebuilds its hotkey list. This feature uses a separate process, called a *worker* thread, to monitor your file system (more on this later). The worker thread that performs this function consumes almost no processor time while

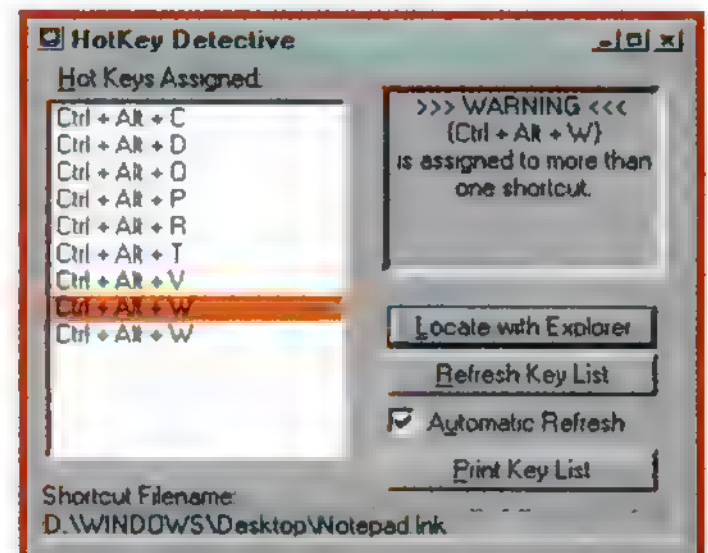


FIGURE 1: HotKey Detective's main dialog box lists all the hotkeys in use on your system.

waiting for changes to occur, so it shouldn't have much impact on your system's overall performance. Once a change is detected, however, the resulting file scan works your disk pretty hard. If you're making extensive modifications to your Start Menu and find that HotKey Detective's constant activity slows your system too much, you can disable this feature by clearing the Automatic Refresh check box. (Note that Automatic Refresh works even if the main window is minimized.) Turning Automatic Refresh back on triggers an immediate refresh. HotKey Detective saves the Automatic Refresh setting at shutdown and restores it the next time you run the program.

The Refresh Key List button tells HotKey Detective to scan your system immediately, whether or not Automatic Refresh is enabled. Note that while a refresh is in progress, this button will be disabled so that you cannot trigger a manual refresh while an automatic refresh is running.

I added this feature because under some unusual circumstances it's possible for HotKey Detective to miss a file change while a refresh is in progress. This happens because of a compromise made necessary by the way Windows reports file system changes. Some activities can cause several change events to occur in rapid succession. For example, moving a shortcut from one folder to another causes four distinct change events: the creation of a new file, a change to the destination folder,

100%-tested guaranteed-compatible memory upgrades.

For the
confidence
to plunge
into just
about
anything.

**ANYTHING'S
POSSIBLE**
MEMORIZE IT

VisionTek: <http://www.visiontek.com> ©1998

Ride the new wave of productivity. With VisionTek's lifetime-guaranteed 100%-compatible PC cards and memory modules. Supported with toll-free Tek-Support, Tek-Fax, Tek-BBS and Tek-Web technical assistance. And our exclusive Corporate Assistance Program. So you and your system can really make a splash. **1-800-360-7185.**



CIRCLE 085 ON READER SERVICE CARD

DELL DIMENSION
Reliable PCs For
High Performance
Computing



DELL DIMENSION™ XPS Pro200n
200MHz PENTIUM® PRO PROCESSOR

- Mini Tower Model
- 32MB EDO Memory
- 256KB Internal L2 Cache
- 2.5GB Hard Drive (10.5ms)
- 17LS Monitor (15.7" v.i.s.)
- 9FX Motion Graphics Accelerator with 2MB VRAM
- 8X Multi-session EIDE CD-ROM Drive

- MS® Office Professional with Bookshelf for Windows® 95 (N.F.I.)
- Microsoft® Windows NT™/30 Days Free Support/MS Mouse
- 3 Year Limited Warranty*
- Upgrade to 1 Year of Windows NT support for only \$149 more.

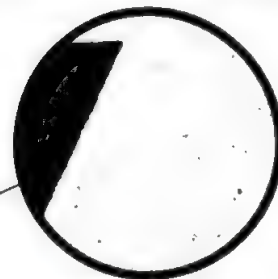
Business Lease†: \$130/Mo.
Order Code #500257

The New
200MHz Dell Dimension
XPS Pro200n

\$3599

**"...THE PENTIUM
PRO LEAVES THE
PENTIUM
IN THE DUST."**

—PC Computing, 3/96



magnified 25x
Notice there's no asterisk
to qualify that statement.



No ifs, ands, or buts. Just
pure, unbridled speed. Period.

That's the Dell Dimension XPS Pro200n. The breathtakingly fast machine that prompted *PC Computing* to reach for oxygen as they remarked, "...it's the fastest Intel-based system we've ever seen—hands down." And in comparing the performance of this Pentium Pro to that of the Pentium, they said, "...exceptional—more than double that of the 133MHz Pentium."

If you're a 32-bit power user, give us a call. We'll set you up with what they're calling the ultimate Pentium Pro system. You know, the one with no asterisks.

DELL

TO ORDER, CALL

800-433-3416

In Canada*, call 800-839-0148

Mon-Fri 7am-9pm CT • Sat 10am-6pm CT

Sun 12pm-5pm CT • <http://www.dell.com/>

Keycode #04261



Dell's featured computer artist is Marco Marinucci of San Francisco, CA

PC Computing, March 1996 article reprinted with permission of PC Computing. ©Ziff-Davis Publishing Company. For a complete copy of our Guarantees or Limited Warranties, please write Dell USA L.P., 2214 W. Braker Lane, Suite D, Austin, TX 78758. *Business leasing arranged by Leasing Group, Inc. †Prices and specifications valid in the U.S. only and subject to change without notice. The Intel Inside logo and Pentium are registered trademarks and the Pentium Pro Processor logo is a trademark of Intel Corporation. MS, Microsoft, Windows and the Windows NT logo are registered trademarks and Windows NT is a trademark of Microsoft Corporation. ©1996 Dell Computer Corporation. All rights reserved.

Publishing Perfection carries lots of digital cameras, scanners, and multimedia equipment. Best source I've seen yet! - Internet Entrepreneur

Publishing Perfection

COMPUTER SHOPPER

The direct line for all your DTP & digital video needs

Agfa StudioScan II CALL
Arcus II - Horizon Plus 1899 / CALL
Vision 35 / FotoTune 3988 / 328
Bell & Howell Scanners CALL
Calcomp ScanGraphics Super Size CALL
Epson ES 1200 / ES 1200 Pro 889 / 1119
Fujitsu Scanners CALL
Hewlett-Packard Scanjet 4p / 4c 499 / 939
Scanjet 4s / Scanjet 4x 349 / CALL
Logitech PageScan Color 379
Microtek ScanMaker Scanners:
E3 24-bit single pass, 1200 dpi, interpolated
image size (flatbed). Includes ImageStar II
2000 Page LE, Adaptec 1502 LE card
E3 Plus Bundle (adds Photoshop LE) 579
E3 Publisher Bundle (adds Photoshop 3.0,
Kai's SE & OmniPage Pro) 699
E6 Standard Bundle (incl. ImageStar II &
2000 Page LE) 579
E6 Pro Bundle (adds Photoshop 3.0) 759
E6 Premium Bundle (adds OmniPage Pro &
Kai's SE) 958

MICROTEK ScanMaker
36-bit single pass, high resolution (600x1200 dpi), color flatbed with Dynamic Color Rendition

III Photoshop 3.0 with transp. adapter) 1989
III Plus (adds OmniPage Direct) 2089
III Pro (adds OP Pro & Kai's SE) 2289
Dynamic Color Rendition Software 99
Auto Document Feeder (50 sheets) 399
ScanMaker 35i (15mm Slide Scanner) 689
ScanMaker 45i (Photoshop 3.0) 4989
PageWiz (Personal Desktop Scanner) 199
Issues you should have a SCSI card, our Microtek Scanners include SCSI compatible drivers!
Minolta QuickScan 35 1788
Mustek PrintScan Color for notebooks 179
Plug-N-Scan color PC/MCIA hand scanner 199
Nikon Coolscan II Int / Ext. 1095 / 1295
Coolscan II w/ Photoshop Int. / Ext. 1499 / 1699
SuperCoolscan Ext. 1995
SuperCoolscan w/ Photoshop Ext. 2399

Polaroid SprintScan 35ES

\$1549 new ES version!

Free! Includes Kai's Power Tools SE

w/Photoshop **\$1948**

Sharp JX-450 / JX-610 4889 / 10870
Storm/Primus DataPen (OCR Pen scanner) 249
ColorMobile Office 249
UMAX SOHO PC (600dpi, 24 bit color) 399
Vista S6 PCL/E2 / PC Pro 2 549 / 649
Vista S8 PCL/E2 / PC Pro 2 749 / 849
Vista S12 LE / S12 Pro 785 / 885
Gemini D-16 (800x600dpi optical) CALL
Mirage (11" x 17") CALL
PowerLook 2 CALL

Missioner PaperPort Personal Scanner 269
Paperport Vx 289

We sell them all! CALL!
Ergo Primera Pro (photographic quality) 1329
Picture 310 (11 x 17 dye sublimation) 3499

Color Laser Printers
Apple Color Laser 12MB (WIN or Mac) 6578
Color Laser 28MB (WIN or Mac) 7328
Hewlett-Packard Color Laserjet CALL
Lexmark Optra C (See below)
QMS Magicolor CX (See below)
Nexra 4915 Color Laser Printer CALL

LEXMARK.
The network-ready
Optra-C color laser printer
\$6239 4MB
24MB 5599 10MB

NEW! QMS magicolor CX
PostScript Level 2, 600 dpi, color laser printer
A 3MB \$5799
magicolor CX 20MB / 32MB \$5989 / 6577

LCD Panels: Proxima, InFocus, NView CALL
IDEK Vision Master MF-8617 789
Vision Master 21 MF-8221 1945
Mitsubishi Diamond Pro 21 1999
Nanos T2-17 / T2-20 Trinitron 1289 / 1990
Nokia 447L 17" monitor 1280 x 1024 695
447X 17"(Energy Star) 1280 x 1024 1015
445X 21" 1600 x 1200 2199
Polaroid Polyview 90 (640x480, 300 ANSI) 6596
Polyview 80 (640x480, stereo, dual inputs) 5985
Polyview 85E (640x480, 300 ANSI) 5485
Polyview 1500 LCD (640x480, 256 k color) 2589
Polyview 1800 LCD (640x480, 2.1 m color) 3459
Polyview 3000 LCD (640x480, 16.7 m color) 4599
Portrait Display Labs Portrait 1700 979

Video editing!

miro
The miro VIDEO DC20 professional video editing system is designed to meet the needs of serious desktop videographers. This high-quality system captures full-screen, full-motion, 640x480 S-video at 60fps directly to your HD. You can also edit and output them in S video quality to PAL or NTSC format videotape.

The DC20 Premium includes Asymetrix 3DFX, Premiere LE, Photoshop LE, Videographic Edges, Kai's SE, Pixar Typestry & 128.....\$1489

The DC20 Producer includes the above software, and adds MediaStudio.....\$1699

The DC20 Studio includes the above software, and adds Fractal Painter 4.0.....\$1989

"The card's output quality is first class; easily good enough for work with applications such as multimedia presentations and computer-based training"

Available for the non-professional:
DC11v Premium.....\$689
DC11v Producer.....\$948
DC11v Studio.....\$1238

Awesome camera! \$298

The advanced ES-3000 Digital Camera offers a full array of features. Stylish 3X power/macro zoom, 3 resolution settings, autofocus & auto flash, expandable memory & more - the perfect mobile image capturing device. PC & Mac compatible. Totally awesome!

Connectix QuickCam 99
Toshiba/Creative Labs IK-M28A 299
Chicon VCC-620 448
Videolabs FlexCam Pro 499

PageMaker 6.0 for Windows or Mac
Only **\$539!**

Get BOTH PageMaker & Photoshop for only \$999

Photoshop 3.0 for Windows or Mac
The world's leading photo design & production tool. Only **\$539**

Get BOTH QuarkXPress & Photoshop for \$1049

QuarkXPress for Windows
The most sophisticated publishing program you will find. **\$577**

Graphics & DTP

Adobe Illustrator 4.1 / Streamline 429 / 125
Photoshop 3.0 539
Pagemaker 6.0 549
Corel Draw 6.0 428
Draw 6.0 Upgrade from ver. 3 or 4 359
Draw 6.0 Upgrade from ver. 5 229
Fractal Design Fractal Painter 4.0 359
Frame Tech, FrameMaker 5X 559
HSC Kai's Power Tools 119
MacroMedia Freehand 379
Micrografx Designer 4.1 TE 415
Photo Magic / Picture Publisher 5.0 99 / 119
Quark XPress Win / Mac 589 / 658

Altech ProPC / TV Plus (VGA to NTSC) 389
MultiPro CTV/Wave Watcher TV II 239 / 349
Apple QuickTake 150 Digital Camera 699
ATI Video Basic / Video II 175 / 329
Chicon ES-3000 298
Digital Vision ComputerEyes RT 289
ComputerEyes LPT / 1024 298 / 429
Telex Eyes (external box VGA to NTSC) 199
Telex Eyes Plus (VGA to NTSC w/ audio) 375
Telex Eyes Pro (VGA to NTSC, genlock) 598
DPS Perception Video Recorder 1585
Fast Electronic Video Machine Lite 2478
FPS 60 CALL
Intel Smart Video Recorder Pro 499
Kodak Digital Cameras CALL
Logitech Fotoman Plus (digital camera) 399
Minolta 399
Orchid Vidalia Pro/D / Premium 589 / 729
Sigma Designs RealMagic Producer CALL
TrueVision Targa 1000 / 2000 PCI CALL
Videolabs FlexCam 589
Videologic MediaSpace / DVA-4000 CALL
Mediator (VGA to NTSC) 1788
Visionetics VIGA 16 (Targa Clone) 998

CD-ROM Recorders

IYC Personal Archiver CALL
Kodak 6X Recorder w/ Transporter 19609
Philips CDD 2000 1198
Pinnacle Micro RCD-5020 Under \$1000
Pioneer DW-S114XCALL
Hewlett Packard SureStor 4020x 499
Smart & Friendly CDR 4000 4x 1499
Sony CDU-920int. 1089 / ext. 1279

YAMAHA CDR-100 int. 4X CALL

Mitsui Quad-Certified Blank Discs:
10+ \$3.95 50+ \$8.50 100+ \$7.95

CD Recording SoftwareCALL
Corel CD Creator 2.0 recording software 359
Young Minds Simphi-CD (optional 4GB)279

RCD-5040

The compact Pinnacle RCD-5040 records at 2x, plays at 4x! Supports ISO 9660, MAC HFS, CD Red Book audio and more. The big 1MB cache buffer ensures compatibility with most HD systems. Features push-button SCSI ID, dual Centronics; comes with Pinnacle's easy software and backup utility for Win/Mac. Includes Corel CD Creator!
Under \$1000 - Call for price!

E-mail us!

pcm9606@perfection.com

If you find a better price, call us before you buy!
PHONE ORDERS: 1-800-245-1584 FAX ORDERS: 414-252-9120
MAIL ORDERS: We accept private and company checks. For faster service send certified check or cashier's check. Please include a daytime phone number. Call for shipping cost.
CUSTOMER SERVICE and INTERNATIONAL ORDERS call 414-252-5000
220V and PAL products available! VAR and dealer inquiries welcome!
Mailing address: W134 NS490 Campbell Dr. P.O. Box 107, Dept. PCM9606
Menomonie Falls, WI 53052-0307 Internet address: pcm9606@perfection.com
All goods new and guaranteed by the manufacturer. Due to copyright laws all sales are final. Defective software replaced immediately. Defective hardware replaced or repaired at our discretion. All returns must be authorized in accordance with our returns policy.
SHIPPING: Hawaii, Alaska, and Foreign orders, call for shipping cost. Hardware: call for shipping cost. Returns are subject to a restocking fee. Because of the volatility of the computer industry, availability and prices are subject to change without notice.
©1996 For your protection we check for stolen credit cards. PCM9606
In Hong Kong, please call our affiliate, Houston Creek Co. at 852-736-2073, FAX 852-736-7150.

International & Customer Service 414-252-5000 **800-684-6558**

Phone hrs. M-Th 8-7 (CST); Fri. 8-6; Sat. 9-5 FAX 414-252-9120

Publishing Perfection. The Multimedia/DTP direct line.

CALL FOR FREE CATALOG!


```

UINT Watch_File_System(LPVOID pParam)
{
    // Get pointer to main app object passed through
    // AfxBeginThread().
    CHKODlg* pThis = (CHKODlg*) pParam;
    HANDLE hChanges[3] = {NULL, NULL, NULL};
    DWORD wait_status;

    // Make sure main dialog is up to date.
    pThis->OncmdRefresh();
    // Get handle to the Mutex object.
    hChanges[2] = pThis->hmy_mutex;
    while (TRUE)
    {
        // Create handles for the file system changes
        // that we need to monitor.
        // First, changes to files in the Desktop
        // folder only.
        hChanges[0] = FindFirstChangeNotification
            (pThis->desktop_folder,
             FALSE,
             FILE_NOTIFY_CHANGE_FILE_NAME |
             FILE_NOTIFY_CHANGE_LAST_WRITE);
        // Second, changes to files and folders in the
        // entire folder tree rooted at the Start Menu
        // folder.
        hChanges[1] = FindFirstChangeNotification
            (pThis->start_menu_folder,
             TRUE,
             FILE_NOTIFY_CHANGE_FILE_NAME |
             FILE_NOTIFY_CHANGE_DIR_NAME |
             FILE_NOTIFY_CHANGE_LAST_WRITE);
        // Enter infinite wait: Windows will
        // tell us when any
        // of the specified events occur.
        wait_status = WaitForMultipleObjects(3, hChanges,
            FALSE, INFINITE);

        // Close the file system wait handles.
        FindCloseChangeNotification(hChanges[0]);
        FindCloseChangeNotification(hChanges[1]);
        // If the wait function didn't fail,
        if ((wait_status < WAIT_ABANDONED_0) &&
            !(wait_status != WAIT_FAILED))
        {
            // See which object satisfied its wait
            // condition.
            if ((wait_status - WAIT_OBJECT_0) == 2)
            {
                // If it was the Mutex object,
                // shut down.
                break;
            }
            else
            {
                // Otherwise, make sure the main dialog
                // isn't busy.
                while (!pThis->m_cmdRefresh
                    || !pThis->IsWindowEnabled())
                {
                    Sleep(100);
                    // Then tell it to update.
                    pThis->OncmdRefresh();
                }
            }
        }
        else
        {
            // If the wait function failed,
            // terminate ourselves and
            // make sure the main app knows we're
            // not running.
            pThis->m_chkAutoScan.SetCheck(0);
            pThis->my_thread = NULL;
            break;
        }
    }
    // Relinquish ownership of the Mutex
    // object.
    ReleaseMutex(hChanges[2]);
    return 0;
}

```

FIGURE 2: This is the controlling function for the worker thread.

deletion of the original file, and a change to the source folder. The system functions that monitor changes cannot report *what* has changed, only that *something* has changed. As a result, when a change does occur, HotKey Detective must reread all the areas of your file system that could be affected.

If the monitor function reacted to each and every one of these changes individually, the program would scan the system from two to six or more times after a single operation (from the user's viewpoint) in Explorer. To avoid this, monitor stops during a refresh operation. It is conceivable that the program could miss a file change while a refresh is in progress, though I have never seen this happen. The manual refresh command exists simply to provide peace of mind.

The Print Key List button does just what it says. When you click the button, you'll see a

standard Print dialog in which you select the device on which to print the list. If you click OK, you'll then see the Select Print Size dialog box. The default point size is 10, but you can pick a different size (ranging from 8 to 24) from the drop-down list if you wish. Clicking the Cancel button in either of these dialogs cancels the entire print process.

It is crucial to note that the information shown in Hotkey Detective represents your hotkey settings *as they are stored on-disk*. Explorer's internal hotkey table may not correctly reflect these settings. If you notice that your hotkeys don't activate the same shortcuts that Hotkey Detective displays, don't panic. Simply shut down your computer and restart it. A full restart is required; you cannot use the undocumented "warm boot" feature invoked by holding down the Shift key while selecting Restart Your Computer.

INSIDE HOT KEY DETECTIVE

I wrote HotKey Detective using Microsoft Visual C++, Version 4.0, and the Microsoft Foundation Classes, Version 4.0. If you download the source code, extract the files from the .ZIP archive into their own directory and use the -d option to preserve the directory structure.

To implement Hotkey Detective, I had to solve two main problems. The more important one was determining where and how Explorer stores its hotkey settings. I didn't find them in the Registry, but I did find a clue. Examining Registry settings (under HKEY_CLASSES_ROOT) for the .LNK and .PIF file types, I discovered that Explorer uses two separate handlers: a Context Handler for .LNK files and a Property Sheet Handler for .PIF files. It is these handlers that present the pop-up menu when you right-click on a shortcut, as well as the Shortcut Properties dialog



Featuring a unique compilation of royalty-free† music clips, Corel Stock Music Library is the convenient and cost-effective way to add an interesting musical element to your multimedia presentations or product demonstrations. The library features music clips of three varying lengths to help you save on editing time. The ten CD-ROMs included offer 352 minutes of original melodies and encompass 21 different music categories. Ranging from corporate to classical, rhythm and blues to ambient and with 103 individual tunes to choose from, Corel Stock Music Library offers music for every occasion.

Use Corel Stock Music Library clips with:

- Digidesign Session
- Digidesign Sound Designer II
- Digital Audio Lab Editor Plus
- Innovative Quality Software SAW Plus
- Macromedia Deck II
- Macromedia SoundEdit
- Passport Designs Alchemy
- SEK'D Samplitude Studio
- Sonic Foundry Sound Forge
- ...and other sound-editing programs

COREL STOCK MUSIC LIBRARY

Over 100 Royalty-Free† Stock Music Clips

INCLUDES 21 CATEGORIES OF MUSIC

- Adult Contemporary •
- Ambient •
- Americana •
- Choral •
- Christmas •
- Classical •
- Corporate •
- Country & Western •
- Global Affairs •
- Industry •
- Jazz •
- Latin & Caribbean •
- Lifestyle •
- New Age •
- Pop/Dance •
- Rhythm & Blues •
- Rock/Metal •
- Science & Nature •
- Sports •
- Various •
- World Music •

**High-quality, original music in
CD Audio and WAV file formats**

\$39⁰⁰*

†Royalty-free rights do not include public performance rights.



Corel is a registered trademark of Corel Corporation in Canada, the United States and/or other countries.

All other product and company names are trademarks or registered trademarks of their respective companies.

Since 1982
ComputAbility
Consumer Electronics

Call Now!

1-800-554-1635

KUR-0231-US

Enter the Corel \$3,000,000 World Design Contest (September '95 to July '96)

To receive a faxed copy of the contest rules and an entry form, please call 1-613-728-0826, ext. 3080. Document # 1125.

To leave a message
1-613-728-0826, ext. 81609.
To send a fax: 1-613-728-2891



COREL®

<http://www.corel.com>

Call now for faxed literature!

1-613-728-0826 ext. 3080

Document # 1099

*US\$ plus applicable taxes.
CIRCLE 103 ON READER SERVICE CARD

KEEP IN STEP

with your desktop performance
needs – now, for the future.

In order for your notebook to keep in step with no compromise desktop performance, you need the Everex STEP Note Plus. The STEP Note Plus comes packed with features equal or better than any desktop PC:

No compromise performance

Up to 133MHz Pentium processor
Up to 40 MB RAM
256KB synchronous L2 cache

Clear, fast graphics

Huge 11.3" or 10.4" DSTN or TFT display
800 x 600 x 256 colors SVGA resolution on 11.3" display
Accelerated PCI graphics

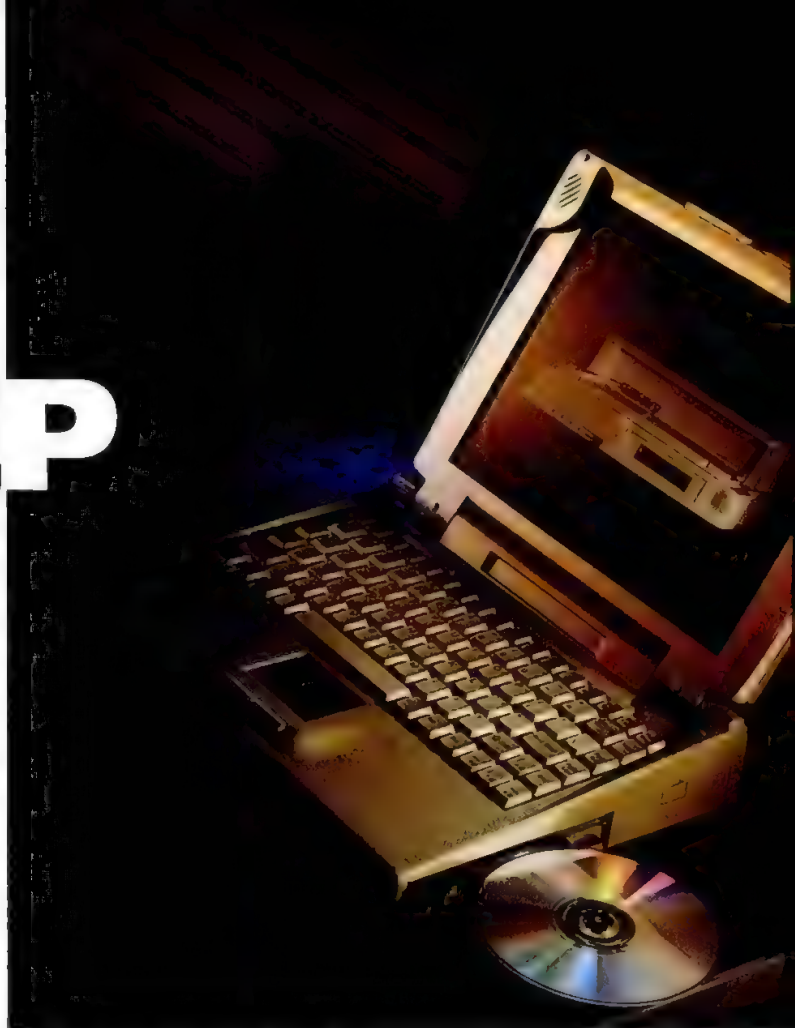


<http://www.everex.com>

Tech Support: 1-800-262-3312,
24 hours a day, 7 days a week

1-800-EVEREX1

CIRCLE 090 ON READER SERVICE CARD



Modularity for customized tasks

Removable floppy drive provides:
4X CD ROM capability
Support for second battery

Removable Hard Drive

Up to 1.3GB

**Multimedia Subsystem Keeps
You in Step**

16-bit stereo sound
Built-in stereo speakers
Built-in microphone

Room to Grow

Full PCMCIA support
Docking station support
(shown in screen)
Port Replicator support

Keep the Beat

2 year limited warranty*
48 hour Hot Swap for first year

All at an affordable price



The Intel Inside logo and Pentium are registered trademarks and the Pentium Processor logo is a trademark of Intel Corporation. Microsoft, Windows and the Windows logo are registered trademarks of Microsoft Corporation. The EnergyStar emblem does not represent EPA endorsement of any product or service. *One year on battery and LCD. Battery rated as percentage used after first 90 days.

Introducing FlashPoint.

The First Affordable Ultra SCSI Adapter for PCs.



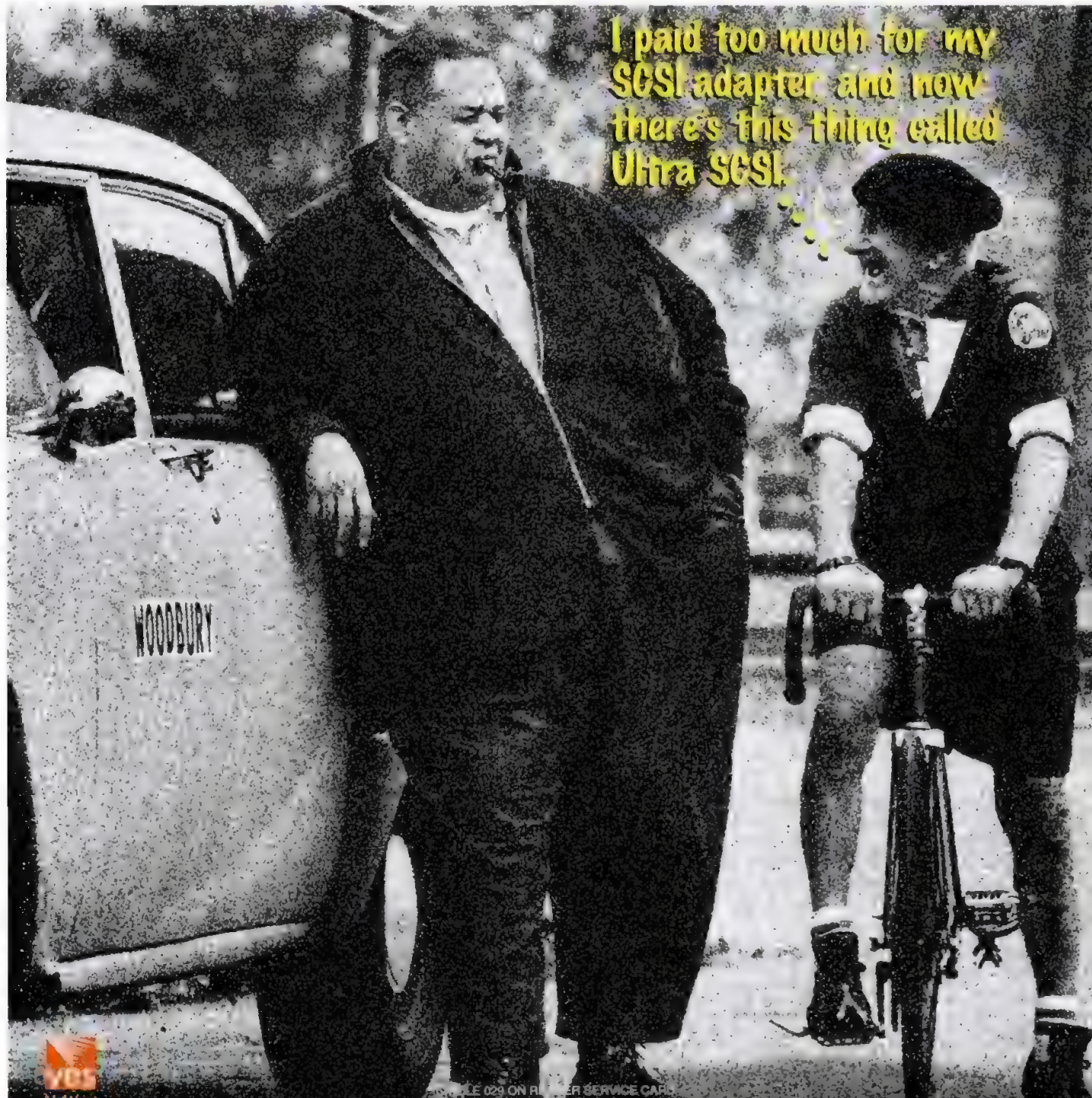
Don't be a victim of old buying habits. Discover the new FlashPoint™ PCI adapters. Exceptional performance and features. The winner of Editor's Choice Awards* around the world. All at prices that won't bust your budget.

FlashPoint adapters power next-generation Ultra SCSI peripherals while offering full compatibility with today's SCSI devices. Unique SeqEngine™ technology reduces SCSI command overhead and boosts data throughput. You also get SCAM-1, AutoTermination and Flash BIOS, advanced ease-of-use features found in adapters almost twice the price. FlashPoint adapters also support Windows® 95, Windows NT, NetWare® and other leading operating systems.

When SCSI performance costs this little, can you afford anything less? Call today for details on our FlashPoint LT, Wide SCSI LW, and dual-channel DL. All backed by a 5 year warranty. Visit our web site at <http://www.buslogic.com> or contact us at 1-800-707-SCSI Ext. 3020.



I paid too much for my SCSI adapter and now there's this thing called Ultra SCSI.



NetWare
tested and
Approved

©1996 BusLogic Inc. 4151 Burton Drive, Santa Clara, CA 95051-1106. Tel: 408-492-7930 Fax: 408-492-9118 BBS: 408-492-1994. All other trademarks and FlashPoint, SeqEngine, and Flash BIOS are trademarks of BusLogic Inc. All other trademarks are property of their respective owners. *Electronic Products, December 1995. PC Mag Editors, November 1995. Windows News Group, December 1995.


```
void CHKDDlg::Launch_Worker(void)
{
    // Create a Mutex object and obtain a handle
    // to it.
    // The TRUE parameter specifies that this process
    // gets immediate ownership of the object.
    hmy_mutex = CreateMutex(NULL, TRUE, NULL);
    // Launch the thread.
    my_thread = AfxBeginThread(Watch_File_System,
                               this,
                               THREAD_PRIORITY_NORMAL,
                               0,
                               0,
                               NULL);

    // If the launch failed, AfxBeginThread() returns
    // a NULL pointer.
    if (my_thread == NULL)
    {
        CloseHandle(hmy_mutex);
        Do_Error_Message("Unable to launch file system
                           monitor.");
    }
}
```

FIGURE 3: *Launch_Worker() creates the file-system monitor thread.*

when you select Properties from that pop-up menu. "Aha!" I thought, "The hotkeys must be stored in the files themselves." Microsoft considers the structure of these files to be proprietary information, so I began some detective work of my own.

The basic process was real nose-to-the-grindstone stuff: Make a copy of a shortcut file, change the setting, then compare the two files to see what had been changed (much as I did while writing my last utility, RecEdit). As it turns out, .LNK files hold the hotkey information in two bytes starting at offset 40h from the beginning of the file. The first byte holds the "virtual key" code; the second contains a shift mask indicating which modifiers the key uses (bit 0 representing the Shift key, bit 1 the Ctrl key, and bit 2 the Alt key; bit 3 is used to indicate extended keys, such as the cursor movement keys on the middle section of 102-key keyboards). If the shortcut does not have a hotkey assigned, both bytes will be 0.

Decoding .PIF files was a bit more complicated. To begin with, I found three different flavors of .PIF files on my system, with three different file sizes: 545, 967, and 995 bytes. The shortest ones are old .PIF files from Windows 3.x. Whenever I made any change to these .PIF files, Explorer rewrote them with one of the other two file sizes.

I determined that .PIF files hold their hotkey information using three bytes in one of two possible sets of nonconsecutive locations. The first byte (1B5h or 1D1h) is the keyboard scan code. The second byte (1B7h or 1D3h) contains a shift mask in which bits 0 and 1 represent the left and right Shift keys (even

though Explorer does not distinguish left and right), bit 2 represents Ctrl, and bit 3 represents Alt. The third byte (1BBh or 1D7h) contains 1 if the key is an extended key, 0 if it is not. I found no correlation between the file size and the offsets used. Some of the longer files had their hotkeys at the lower offsets, and some of the shorter ones had their hotkeys at the higher offsets.

I did notice that the upper four bits of the correct shift-mask byte were always 0, and that the other possible location was always in the middle of a string of ASCII text that contained no control

characters (values less than 20h). Therefore, I found I could determine which locations held the settings by the process of elimination. To find the correct set of locations for a particular file, I looked at the two shift-mask offsets and used the set in which the upper four bits were 0. This may seem arbitrary and kludgy, but it works!

AUTOMATIC DETECTION

The next important task to accomplish was to keep HotKey Detective's information current. Windows is a multitasking environ-

ment, so it's possible for the user to change hotkey settings, or even completely rearrange the Start Menu and Desktop folders, while HotKey Detective is running. I could have left it up to the user to refresh the dialog manually, but that seemed clumsy: After all, the whole point of having a computer is for the machine to automate mundane tasks like this. Since there are many different operations that can affect the user's hotkey settings, I had to find a way for HotKey Detective to detect those changes and update itself automatically.

I accomplished this using multiple threading. Whenever Automatic Refresh is turned on (at startup, or when the user checks the Automatic Refresh box), HotKey Detective launches a separate thread that sits in the background and watches for changes to relevant portions of the file system. Specifically, it looks for the following:

- A change to the name or last write date of any file (but not folders) in the Desktop folder. (There's no need to watch subfolders of the Desktop, because Explorer will not use any shortcuts assigned there.)
- A change to the name or last write date of any file or folder in the entire tree rooted at the Start Menu folder.

Since this thread does not require any direct interaction with the user, I created it as a worker thread instead of a user-interface thread. The major difference between the two thread types is that a worker thread doesn't have a *message pump* (a function required to process standard Windows user-interface messages such as keystrokes and mouse clicks), because it doesn't interact directly with the user. A worker thread is normally used to perform a specific task in the back-

```
void CHKDDlg::Kill_Worker(void)
{
    HANDLE hThread;

    // If thread pointer is not null,
    if (my_thread)
    {
        // get handle to the worker thread.
        hThread = my_thread->m_hThread;
        // Releasing the Mutex object transfers
        // ownership to the the worker thread.
        // signalling it to shut down.
        ReleaseMutex(hmy_mutex);
        // Use thread handle to wait for the thread to terminate.
        while (WaitForSingleObject(hThread, 500) == WAIT_TIMEOUT);
        // Set thread pointer to null.
        my_thread = NULL;
        // Destroy our Mutex object by closing its only handle.
        CloseHandle(hmy_mutex);
    }
}
```

FIGURE 4: *Kill_Worker() terminates the worker thread.*





pentium[®] PENTIUM.PRO[™]

400 & 200MHz Pentium[®]!



"For the fifth year in a row Xi Computer Corporation delivered the fastest Intel-based AutoCAD system we've seen to date" – (Art Liddle, CADalyst, 1996)

Xi[®] MTower SP or DP

- Intel[®] Pentium Processor, Intel Triton C.S.
- 512KB SBP Cache, PnP F. Bios
- 4xPCI, 3/5xISA, 2HSS, 1EPP, Dual IDE4
- 16MB 60ns EDO, 1.27GB 9ms IDE4 HD
- Diamond Stealth 64 MPEG 2MB PCI
- 17" Monitor 26dp 1600 x 1280NT PnP
- 1.44 FD, 104K Kb, 3B Logitech Mouse
- Xi 10Bays Mid Tower Case 250W UL PS
- MS Windows[®] 95 CD, 6 x CD-ROM

SP166MHz: \$2899 DP332: \$3499

Xi Pro200 MTower SP

- Intel Pentium Pro Processor, Natoma CS
- 256KB SBP Cache, PnP Flash BIOS
- 4 x PCI, 3 x ISA, 2HSS, 1EPP, Dual IDE4
- 16MB 60ns EDO, 2.5GB 9ms IDE4HD
- Matrox Millenium 2MB WRAM PCI
- 17" Monitor 26dp 1600 x 1280NT PnP
- 1.44 FD, 104K Kb, 3B Logitech
- Xi 10Bays Mid Tower Case 250W UL PS
- MS Windows 95 CD, 6 x CD-ROM

166MHz: \$3699 SCSI 4GB: \$4499

Xi Pro400 NTower DP

- Intel Pentium Pro Processor 256K SBPC
- 4xPCI, 4/5 x EISA, 2HSS, 1EPP, Orion CS
- Ultra Wide SCSI 40MB/sec, PCI Ctrl
- 32MB 60ns F. Page, 4.3GB 9ms Wide SCSI
- Matrox Millenium 2MB WRAM PCI
- 17" IIYAMA 8617E .26dp 1600 x 1280NI PnP
- 1.44 FD, New 104K Kb, 3B Logitech PS2
- Xi 11Bays Full Tower Case 300W UL PS
- MS Windows NT 3.51, 6 x CD-ROM

166MHz: \$8999 DP400: \$6999

MULTIMEDIA PRO KIT

- CreativeLab AWE32 PnP, 25W Power Spkrs.
- Choice of CD-Titles: **\$ 199**
- MS Office 95 Pro w/Bookshelf: **\$ call**

MONITOR UPGRADES

- IIYAMA 17" 9017E .25ag **\$ 189**
- IIYAMA 21" 9021E .30ag **\$ 1239**
- 1600x1280NI 72/76Hz Diamondtron

VIDEO & SW UPGRADES*

- 8MB/4MB WRAM 220DAC **\$ 599/\$ 179**
- New #9 Imagine 128 PowerS 4MB **\$ 329**
- Vibrant ACAD Soft Engine 3.6 **\$ call**

All Systems Xi Certified for AutoCAD 13, 3D Studio MAX, PRO/E & MicroStation 95.
100+ Options available in stock. Call for a Custom Quote. Business Lease from \$78/month.



CALL TOLL FREE: 1-800-432-0486

INTL: (714) 498-0858 FAX: (714) 492-6571

http://www.win.net/xi_comp E-Mail: xi@xi_comp.win.net



THREE YEARS WARRANTY: Parts & labor on monitors, optional on systems. Xi-ONSITE optional express free replacement parts shipping. **30 day money back guarantee.** 24Hr Life Time Toll-Free HW Tech Support.
Mail: Xi Computer Corporation, 980 Calle Negocio, San Clemente, CA 92673

CIRCLE 018 ON READER SERVICE CARD

All prices and specifications subject to change without notice. Prices do not include shipping. For more information on Xi products & services call or write to Xi Computer. Xi is not responsible for photographic & typographical errors. Monitors Back does not include freight both ways & software. Video upg. from 2MB DRAM Stealth. Xi, the Xi Logo, Workstations are registered trademarks & Xi Tower, MTower are trademarks of Xi Computer Corporation. Xi MTower & Xi Tower systems are FCC class A intended for professional use only. Some models might be for export only and not immediately available in the USA. The Intel Inside Logo and the Pentium are registered Trademarks and the Pentium Processor Logo and the Pentium Pro Processor Logo are Trademarks of Intel Corporation. All other trademarks of their respective companies. Copyright © 1996 Xi Computer Corporation. All Rights reserved.

NEW
DIAMONDTRON™
CRT
DESIGN



DIAMONDTRON FROM MITSUBISHI. THE REINVENTION OF CRT TECHNOLOGY.

Now there is an entirely new way of looking at your monitor. DIAMONDTRON from Mitsubishi Electronics is a complete reinvention of CRT technology. Everything you've seen before will pale in comparison to the display performance and application versatility of Mitsubishi's new family of sharper and brighter DIAMONDTRON monitors, including the Diamond Pro® 17TX (17" CRT/16.0" diagonal viewable image) and Diamond Pro 21TX (21" CRT/19.7" diagonal viewable image) models.

Along with the superb image quality and large viewing area of the DIAMONDTRON CRT is a Digital Chassis design which results in a lighter, more compact enclosure for easy integration into existing work spaces.

Make sure your next monitor isn't based on out-of-date technology. Ask for Mitsubishi's cutting edge DIAMONDTRON

monitors. With a design this revolutionary, there will soon be followers. So, remember to specify the *original* from Mitsubishi Electronics. For more information on our complete line of color monitors, call us at 1-800-843-2515 in the U.S. and Mexico. In Canada call 1-800-387-9630. For immediate product specifications, call Mitsubishi Qwikfax at 1-800-937-2094. Or reach us online at <http://www.mela-itg.com>

The Mitsubishi Desktop Product Line

Model	CRT Size	Maximum Addressable Resolution (H x V) Pixels	Auto-Scan Range	Estimated Selling Price
Performance Line				
Diamond Scan 15HX	15"/13.8" DVI*	1280 x 1024/60 Hz NI, 1024 x 768/75 Hz	H:30-64 kHz, V:50-90 Hz	\$450.00
Diamond Scan 15VX	15"/13.8" DVI*	1280 x 1024/60 Hz NI,	H:30-65 kHz, V:55-100 Hz	\$410.00
Diamond Scan 17HX	17"/15.7" DVI*	1600 x 1200/65 Hz NI	H:30-82 kHz, V:50-130 Hz	\$849.00
Diamond Scan 20H	20"/18.6" DVI*	1600 x 1200/65 Hz NI	H:30-82 kHz, V:50-152 Hz	\$1,699.00
Diamond Scan 20M	20"/18.6" DVI*	1024 x 768 I, 800 x 600 NI	H:15-38 kHz, V:45-90 Hz	\$1,699.00
Diamond Scan 20LP	20"/18.6" DVI*	1024 x 768 I, 800 x 600 NI	H:15-38 kHz, V:45-90 Hz	\$1,745.00
Professional Line				
Diamond Pro 17TX	17"/16.0" DVI*	1600 x 1200/66 Hz NI	H:30-86 kHz, V:50-152 Hz	\$1,059.00
Diamond Pro 21TX	21"/19.7" DVI*	1600 x 1200/75 Hz NI	H:30-93 kHz, V:50-152 Hz	\$1,899.00

* DVI: Diagonal Viewable Image. Certain non-standard timing formats will reduce Diagonal Viewable Image.

 **MITSUBISHI**
DISPLAY PRODUCTS



Diamond Pro 17TX

Diamond Scan 20H

Diamond Pro 21TX

As an Energy Star Partner, Mitsubishi Electronics has determined that these products meet the Energy Star guidelines for energy efficiency.

©1996 Mitsubishi Electronics America, Inc. DIAMONDTRON is a trademark and Diamond Pro is a registered trademark of Mitsubishi Electronics America, Inc.

See us at PC Expo Booth # 4304
CIRCLE 280 ON READER SERVICE CARD

PIPELINE MAKES USING THE INTERNET PRETTY DARNED EASY.



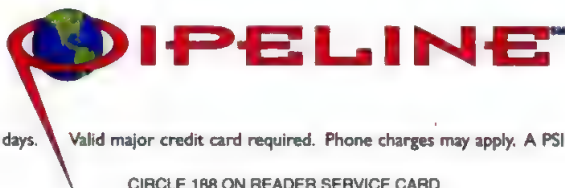
THE CANDY: Easy to take, easy to use, not to information to get your doctorate; e-mail that virtually eliminates Relay Chat, FTP, Gopher and the opportunity to create your easy interface is fully compatible with leading Web browsers, including unlimited local access to all the Internet has to offer and



mention immediate access to the Internet; enough the need for the post office; as well as News Groups, Internet own homepage on the World Wide Web. Our award-winning, Netscape. **THE DEAL:** For only \$19.95 a month you get no sneaky additional hourly charges to make you cranky.

THE NUMBER: If you're still not interested, go ahead and ring us anyway. The call's free, the software's free and so are your first 14 days. You've got nothing to lose.

1-800-805-9835



Service fees apply beyond the first 14 free days. Valid major credit card required. Phone charges may apply. A PSINet Company. © PSINet Inc. 1996.

CIRCLE 188 ON READER SERVICE CARD

Introducing
MiniCad 6
for Windows

SHOULD MiniCad 6 BE YOUR CAD SOLUTION?



1996



1996



1996

- ◆ A proven market leader that handles any job; 2D, 3D, materials lists, and presentations
- ◆ No extra modules to buy. Specialized support for many design professions: A/E/C, mechanical, civil and electrical engineering, landscape, theater/lighting, food service and much more
- ◆ A program that's easy to use, easy to buy: lower entry & training costs, less downtime AND much higher productivity
- ◆ THE cross-platform solution: identical code means flawless file transfer between Mac & Windows. Full 32-bit power!
- ◆ A program that can be used for every stage of the design process — from concepts, to working drawings, models and visual proposals
- ◆ A program you can try... RISK-FREE

MiniCad 6

MACINTOSH WINDOWS

THE FULL-FEATURED CAD PROGRAM with INTEGRATED PROFESSIONAL SOLUTIONS

"We like MiniCad for its ease of use, together with the quality of product we can produce with it. I have some experience with AutoCAD and I find MiniCad so much easier. Choosing MiniCad was a big plus."

Monty Anderson
MJA Design, Ltd.
Chesapeake, VA



Graphsoft[™]

A NASDAQ TRADED COMPANY

CIRCLE 026 ON READER SERVICE CARD

MINICAD 6: THE COMPLETE CAD PACKAGE!

MiniCad 6 has just what you're looking for: a complete 2D/3D drafting environment, a powerful database allowing you to generate estimates, schedules, reports and more, and a built-in macro language to automate routine drafting tasks...even digital terrain modeling! All highly organized and easy-to-use. AND...full file transfer capabilities to other major programs!

FREE DESIGN AND DRAFTING TOOLKIT™

Our FREE Toolkit is packed with thousands of symbols, tools, commands, templates, parametrics, formatted reports, worksheets and sample files targeted at specific industries. No extra symbol libraries to buy! Fewer hassles and more time to design — so much of the work has been done for you. These specialized feature sets are powerful, complete and solidly integrated into MiniCad 6, giving you the design flexibility and targeted industry solutions you need.

AN AGGRESSIVE COMPANY WITH 11 YEARS OF CAD EXPERIENCE

Now in its 11th year, Graphsoft's MiniCad is the best-selling CAD program on the Macintosh, utilized by design professionals in over 80 countries and 12 languages.

TRY IT RISK-FREE FOR 30 DAYS!

When you buy MiniCad 6 from a participating dealer, you'll get Graphsoft's no-hassle 30 day money back guarantee. You'll also get 18 months of free technical support, a 24 page quarterly newsletter and multi-media CD that covers the operation of each tool and command, and working MiniCad files from around the world.



For more information please contact Graphsoft at 10270 Old Columbia Road, Columbia MD 21046 1-800-486-8053 (Dept. M) or 410-290-5114 Fax: 410-290-8050. In Canada call PaXar at 1-800-260-0905. For Academic pricing call 1-800-531-3227

MiniCad, Design and Drafting Toolkit, and Graphsoft logo are trademarks of Diehl Graphsoft, Inc. QuickTime, QuickDraw and Macintosh are trademarks of Apple Computer. Windows is a trademark of Microsoft. AutoCAD is a trademark of Autodesk, Inc.

Talk to Me, Baby.



VoiceView® lets the user quickly alternate between **talking on the phone and sending files in the same call**, making communications easy and seamless. New ways of conducting business are already in place with airline reservations, on line banking and tele-shopping.



The included miniature headset and communications software help create a **personal voice mail system** on your laptop. The DataVoice™ 3400 answers your phone, plays your recorded greeting, records messages, and stores them on your laptop's hard drive.



Optional cables connect the DataVoice 3400 to most **cellular phones**, including Motorola® Flip phones! Stay connected, no matter where you are. MNP10EC protocol assures the highest quality cellular connections.

Announcing another TDK first in the world of PC Cards and the next generation in modems—The DataVoice™ 3400.

The first modem PC Card with Radish® VoiceView® capabilities, the **DataVoice 3400** supports V.34 28,800 bit/sec data, 14,400 bit/sec send and receive fax, data compression, and error correction using an on-card DAA phone line interface.

All TDK's PC Cards are guaranteed compatible with existing and future laptops. TDK's family of PC Cards also includes a line of Ethernet LAN cards, and fully certified international modem and LAN cards.

What every laptop needs, what every user shouldn't be without. Voice your opinion—ask for TDK.



TDK
Systems



E-mail: answers@tsd.ssi1.com <http://www.tdksystems.com> 1-800-999-4TDK

©TDK Systems. All trademarks are registered trademarks of their respective owners.



Also compatible with DOS, Windows NT™ and OS/2

ground while the main application continues interacting with the user. This task is usually single-ended; that is, it doesn't require any input from the user, and once the task is complete, the worker thread terminates itself automatically. Worker threads are often used for tasks such as a word processor's auto-save function.

HotKey Detective's worker thread is a little unusual, because its task is open-ended: It must continue monitoring the file system until the main application tells it to stop. The tricky part in designing the worker thread was finding an effective method to terminate it from within the main application. This is critical, because your system will suffer from memory leaks if the worker thread is still running when the application's primary thread terminates. The worker thread must also be able to communicate with the main dialog when it detects a change to the file system. To make all this possible, I declared the worker thread's global control function, `Watch_File_System()`, as a friend of the `CHKDDlg` class (see Figure 2). As you might expect, the control function determines what tasks the thread will perform. When the control function returns, the thread terminates.

The `Launch_Worker()` function (see Figure 3) handles the job of starting the worker thread. I begin by creating a *mutex* (mutual-

THE TOP 10 UTILITIES

- 1 **STRING** Batch file enhancer
- 2 **WARPCA** OS/2 file cabinet
- 3 **APPOIN** Windows appointment book
- 4 **ZDROP** Drag-and-drop unzipping
- 5 **FDDLLS** Finds dead DLLs
- 6 **SPAD** Enhanced Windows Notepad
- 7 **WINBAR** Taskbar for Windows 3.1
- 8 **INCTR2** Monitors program installation
- 9 **WMATCH** Compares directory contents
- 10 **1MBF** Protects low memory

ly exclusive access) object. A mutex object provides a simple, efficient mechanism for synchronizing thread execution, because a mutex object can be owned by only one process at a time. The worker thread passes the mutex handle to the `WaitForMultipleObjects()` API call. When the main window relinquishes its ownership of the mutex object,

this API call signals the worker thread to shut down.

After creating the mutex object and storing a handle (`hmy_mutex`) to the object so that the worker thread can access it, I call `AfxBeginThread()` to create the worker thread, specifying `Watch_File_System()` as the thread's control function. Since I did not specify the `CREATE_SUSPENDED` flag in the call to `AfxBeginThread()`, the control function begins executing immediately.

In `Watch_File_System()`, I call the dialog's `OnCmdRefresh()` function to make sure the dialog is up to date, then set up an array (`hChanges[]`) of three handles for use by the `WaitForMultipleObjects()` API function. I set the third element as a copy of the handle to the mutex object created by the parent process, then enter an infinite `while()` loop.

On each pass of the loop, I set the first two elements in the `hChanges[]` array as handles to file-system change events. I pass all three handles to the `WaitForMultipleObjects()` API function. This API function returns when either one of the wait conditions is satisfied or the specified time period elapses. In this case, I set the timeout value to `INFINITE` to minimize the processor time required. As a result, the worker thread spends the majority of its time in a suspended state, wait-

The Monitor that Shows You the Whole Enchilada.



The Pivot 1700™ has other 17" color monitors beat from top to bottom. It pivots from horizontal to vertical mode to give you the tallest, sharpest display you can get. Taller, even, than a 21" monitor! And a whole lot more affordable. So now you can read a full 8.5" x 11" page *without scrolling*.

Give us a call today or, if you prefer, e-mail us at pdcalif@aol.com for the whole story.



800-858-7744 Ext. 21

<http://www.portrait.com>

CIRCLE 131 ON READER SERVICE CARD

You'll Wonder Why You Ever Went to Statistics Class

STATGRAPHICS® *Plus* for Windows®

Because **STATGRAPHICS Plus** for Windows packs everything you need to know about statistics into one easy-to-use package. We've filled it to the brim with exciting features you won't find anywhere else. Like menus that guide you through even the most complex analyses. Eye-popping graphics designed to be so interactive they practically read your mind. And our convenient StatGallery that allows you to print graphics and text on the same page to produce boss-pleasing reports and presentations every time — on time.

Instant Interpretations from StatAdvisor

Whether or not you ever took a statistics class, you'll find yourself mastering everything from regression analysis to ANOVA. But if you need a refresher course, our revolutionary new StatAdvisor will help you interpret your results with a click of the mouse. Your analyses will become so understandable, you'll think we packed your favorite statistics professor in the box for you.

Faster, Easier, Smarter

There's more, too. Like our unique StatFolio feature that lets you automatically store and re-run an entire analysis without worrying about writing macros or any complex commands. And support for OLE and DDE that gives you the flexibility to share data and results with other Windows applications. And for more specialized tasks, you can choose from five optional modules: Quality Control, Experimental Design, Time-Series Analysis, Advanced Multivariate Methods, and Advanced Regression Models.

In a Class by Itself

Data analysis doesn't get any easier than this. Whether you're a novice or an expert, **STATGRAPHICS Plus** for Windows puts you ahead of the class. And it runs under Windows, Windows NT, and Windows 95. The choice is yours. So call today for all the details.

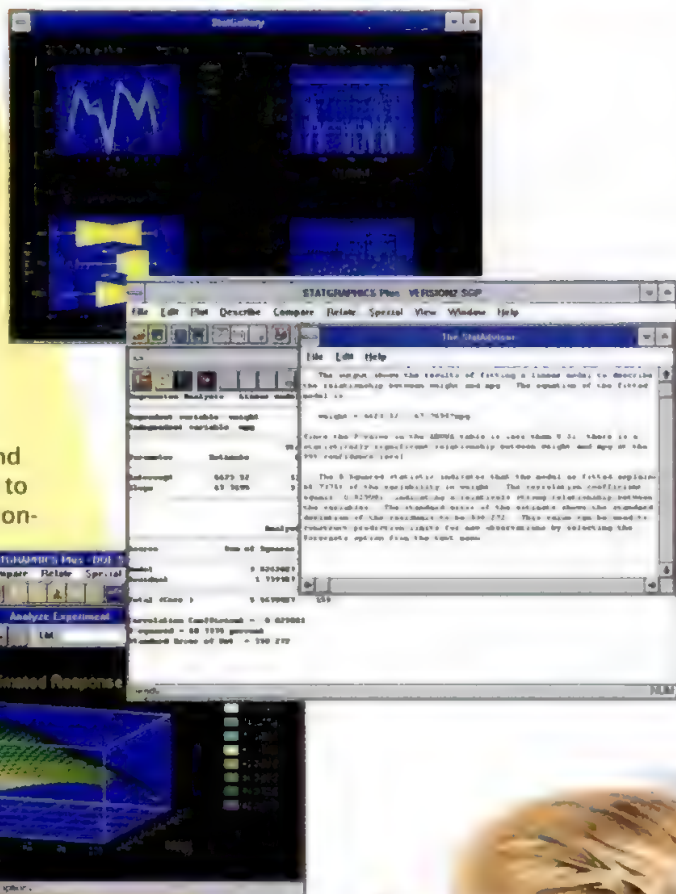
800-592-0050 - Ext. 200

Outside the U.S. - 301-984-5412

CIRCLE 365 ON READER SERVICE CARD

Copyright © Manugistics, Inc. 1996. STATGRAPHICS is a registered trademark of Manugistics, Inc. Windows is a registered trademark of Microsoft Corporation.

<http://www.statgraphics.com>



ing for the operating system to signal one of the specified events.

When `WaitForMultipleObjects()` does return, I check its return status. If its value indicates an error condition, I set the `my_thread` pointer to `NULL` so that the main process knows the worker thread is not running and then shut down. If the third handle satisfied its wait condition (indicating that the main dialog has relinquished ownership of the mutex object), I break out of the loop and exit the function, terminating the thread. If it was one of the first two handles that satisfied the wait condition, I know the wait function detected a change. As long as a refresh is not already in process, I call the dialog's `OnCmdRefresh()` member function, in effect clicking the Refresh Key List button by remote control. If a

manual refresh was already running when a file-system change occurred, I must refresh the dialog a second time, because I don't know whether the directory scan has already passed the area of the disk that has been changed.

When I'm done with the worker thread (which means the user has either disabled Automatic Refresh or closed the dialog), I must shut it down by calling the `Kill_Worker()` function (see Figure 4). If `my_thread` is `NULL`, the thread isn't running, so `Kill_Worker()` simply returns. Otherwise, I get a handle to our worker thread. This step is critical, because the thread handle is no longer available through the object after the thread terminates.

Next I call `ReleaseMutex()` to relinquish ownership of the mutex object, signaling the

worker thread to shut down. I then pass the thread handle to `WaitForSingleObject()`, which returns when the thread terminates. Finally, I set the `my_thread` pointer to `NULL` to let other parts of the program know that the worker thread is no longer running, then destroy the mutex object by closing its handle.

I spent many, many hours working on this program, but it was time well spent. In the process I learned a lot about Windows 95, particularly its powerful multithreading capability. I'm sure you'll find HotKey Detective a useful addition to your utility arsenal, and I hope you have as much fun using the program as I had writing it. □

Gregory A. Wolking is the primary sysop of the Utilities/Tips Forum on ZD Net.

GUIDE TO OUR UTILITIES

ABOUT HOTKEY DETECTIVE...

PURPOSE Windows 95 has support for hotkeys, but it's quirky at best, buggy at worst, and poorly documented. HotKey Detective lists the hotkeys in use on your system, along with their associated shortcuts, and launches Explorer if you want to make changes. Thus it provides a mechanism for discovering and eliminating duplicate hotkeys, which can create problems on your system.

USAGE To install Hotkey Detective, simply copy it to your hard disk and create a shortcut for it. It does not have to be in your DOS PATH. When you run Hotkey Detective, it scans your Start Menu and Desktop folders and finds the hotkey assignments that Explorer stores in your .LNK and .PIF files. It presents a sorted list of all the hotkeys in use. Because the list is sorted by hotkey name, any items with duplicate assignments will be grouped together. If there are duplicates, Hotkey Detective displays a warning message beside the list and automatically selects the first duplicated key name.

When you select a key name in the list, the full path to the corresponding shortcut appears in the Shortcut Filename box at the bottom of the window. If the filename is too long for the text field, you can resize the dialog and the controls will rearrange themselves appropriately. The Print Key List button lets you print your hotkeys and their associated shortcuts.

To change an assignment, you can either double-click on a key name or select a key name and either click the Locate with Explorer button or press Enter. Hotkey Detective will launch Explorer in dual-pane view, with the shortcut selected in the right-hand pane and the appropriate segment of the folder tree opened in the left-hand pane.

The Refresh Key List button tells the program to rescan your system immediately. The Automatic Refresh check box lets you disable this feature if it bogs your system down. The check box setting is saved automatically when you exit the program.

Explorer is unreliable at updating its internal hotkey table. As a result, you can end up with "ghosted" hotkeys that continue to launch items even after you have removed their assignments, along with keys that continue to launch the wrong items after you have eliminated du-

plicate settings. To correct this, shut down your system and reboot.

SUPPORT Help for PC Magazine's utilities can be obtained electronically in the Utilities section of ZD Net's Tips Forum (GO ZNT:TIPS). The authors of current utilities generally visit this forum daily. You may find an answer to your question simply by reading the messages posted in the forum. If the author is not available and the forum sysops can't answer your question, the Utilities column editor, who also checks this forum each day, will contact the author for you.

...AND GETTING PC MAGAZINE UTILITIES



Here's how you can access PC Magazine Online, where you'll find all our utilities and other PC Tech files: **ZD NET** To join CompuServe/ZD Net (formerly Ziff-Net), call 800-895-4596 (voice) and request the PMZ offer. CompuServe members can join ZD Net by typing GO ZIFFMEM at any CompuServe ! prompt. If you're already a member of ZD Net, you can get the current utility free of connect charges by typing GO FREEUTIL at any CompuServe ! prompt. Other PC Tech Files are available individually in the Utilities/Tips and Programming forums or bundled as the volume archive file.

INTERNET You can obtain the utility and the volume archive through anonymous FTP from our Internet site. The address is <ftp.zdnet.com>. Use the word anonymous as your log-in name and any of your e-mail addresses as the password. Look in the subdirectory /pcmag/1996/0611/. The volume archive filename is v15n11.zip. The utility and archive are compressed with PKZIP, Version 2.04.

You can also visit our home page on the World Wide Web at <http://www.pcmag.com> and choose Download from the navigation bar at the bottom of the page.

BY FAX OR MAIL If you don't have a modem or Internet access, you can fax 508-368-0141 or write to PC Magazine Utilities, c/o Image Software Services, 55 Green St., Clinton, MA 01510-3099.

The programs presented in PC Magazine can be copied but are copyrighted. You may make copies for others if no charge is involved, but making copies or using any portion for any commercial purpose is strictly prohibited.

**DO IT WITH
BRAVADO.**



Digital Video Editing for Under \$1000.

Introducing the **Bravado 1000** from
Truevision, the company that invented
desktop digital video. It's the first professional
32-bit video capture and editing solution for under
\$1,000. Complete with all the software and support
to put your dreams in motion. You know you want it.

So call **1-800-545-TRUE** and find out
where to get it. Then do it with **Bravado**.



TRUEVISION
First in Digital Video

www.truevision.com

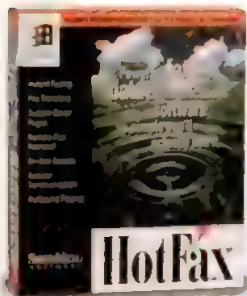
CIRCLE 003 ON READER SERVICE CARD





AT
**SMITH
MICRO**
WE DECIDED
TO TRACK OUR
CUSTOMERS.

**20
MILLION**
OF THEM HAVE
GOT THE POINT.



Upgrade from your old fax software to the one product that handles all of your fax, data and paging communication needs for Windows 95, 3.1x and NT.

For ten years, Smith Micro Software has been providing communications software products to users around the globe. From our perennial best-selling QuickLink to our newest releases, over 20 million users worldwide own Smith Micro software titles.

HotFax is Smith Micro's integrated fax, paging and data communications product for Windows 95, 3.1x and NT. Features include extensive logging, caller ID support, distinctive ring, chat mode and more. HotFax even adds "Fax" to Windows menus, saving you time by not having to change print drivers back and forth each time you fax.

Laptop users can selectively retrieve faxes remotely without paying a third-party service and HotFax includes single-click cellular support.

With Windows 95, HotFax routes MS Exchange mail to alphanumeric pagers. It also supports direct outbound numeric and alphanumeric paging.

Smith Micro is the leader in fax, data, telephony and video technologies with QuickLink II, HotFax, HotFax Message Center, FaxUSA, HotLine, HotDisk, HotPage and AudioVision. For more information or the name of your nearest dealer, call us at 800-964-SMSI or point us out on the web at www.smithmicro.com.

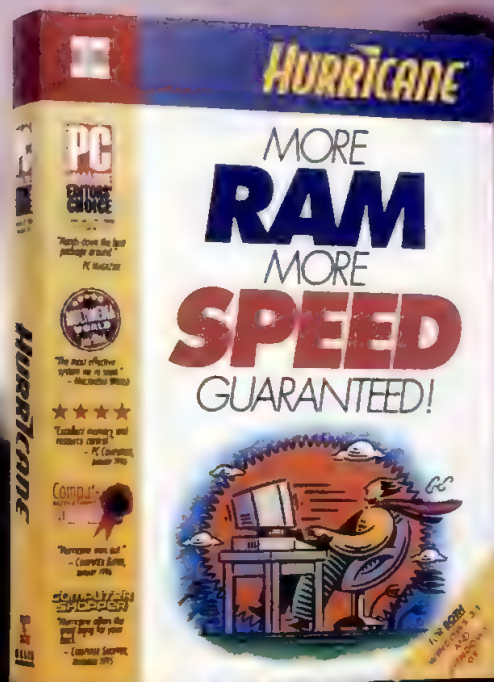
SMITHMICRO 
SOFTWARE
51 Columbia, Aliso Viejo, CA 92656
714-362-2345, fax 714-362-2300

HURRICANE™ WILL BLOW YOU AWAY.

WHICH WILL PUT YOU IN EXCELLENT COMPANY.

AND NO, IT ALSO DOESN'T HAVE THE EDITORS OF:

PC MAGAZINE
MULTIMEDIA WORLD
PC COMPUTING
COMPUTER BUYER
COMPUTER SHOPPER



With HURRICANE™, your PC will both run faster and run more smoothly for about 50 bucks. But why take our word for it? **PC Magazine** raves: "Hurricane whirled Windows performance to new heights... Nothing else came close to letting us load and run so many applications at once... **Just down the best package around.**" **Windows Magazine** is in awe: "Hurricane is a veritable Hurricane... the difference is dramatic... let your system exceed its limitations." **PC World** is definitive: "Hurricane provides the best performance... a new star on the horizon. Hurricane allowed me to load 14 of my favorite programs at the same time." **PC Laptop** goes over the top: "Hurricane is as hot as it gets." **Computer Shopper** gets to the bottom line: "Hurricane gives the most bang for the buck." You could go on and on, but you're probably eager for your own copy of Hurricane (over 3 million installations a snap.) So visit your favorite software dealer, or order direct by calling 1-888-715-2000. If you're not blown away, return within 60 days for a full refund.

Phone: 718-392-3100 Internet: <http://www.helix.com>

CIRCLE 067 ON READER SERVICE CARD

Only one database
easier without making



It makes your life so much less of a dreck first.

**FILEMAKER PRO 3.0. THE ONLY DATABASE DESIGNED
FOR BUSY BUSINESS PEOPLE, NOT GEARHEADS.**

FILEMAKER PRO WOWS CRITICS, WINS HEARTS.

"It (FileMaker Pro 3.0) is easier than ever to use.... If you're relatively new to databases, demand ease of use in creating and working with databases, and need compatibility between Windows and Mac users, FileMaker is an excellent choice."

— WINDOWS SOURCES, 2/96

"Most relational databases are designed for large corporations that employ an army of programmers and administrators. In the small office world, who has the time or the resources? The answer to that would have to be FileMaker Pro 3.0."

— HOME OFFICE COMPUTING, 2/96

"FileMaker Pro 3.0 is one of the few end-user databases that actually lives up to its claims of simplicity."

— PC COMPUTING, 4/96

Business is booming and you could use a database. But the thought of putting your business on hold while you figure one out doesn't exactly thrill you. That's why there's FileMaker® Pro 3.0 for Windows. FileMaker Pro is specifically designed to be easier to use than typical Windows databases. Just open up the box and start running your business like a well-oiled machine.

FileMaker Pro 3.0 has all the features you could ever need. It has a complete set of database templates to get you started, powerful mail

merge capabilities, new word processing improvements, and automatic phone dialing. Its ScriptMaker® feature lets you automate routine tasks and menu commands, helping you

be even more efficient. Because it's relational, a change in one database will automatically be reflected wherever you use the information, saving you loads of time and hassle. Its built-in networking support allows many users to share a database

simultaneously even over the Internet.

And last but not least, FileMaker Pro is specially designed to take advantage of the latest technology in Windows 95, but also runs on Windows 3.1 and Windows NT.

If you want a database that helps sort out your business without putting you out of sorts, your decision is clear: FileMaker Pro 3.0.

For more information about FileMaker Pro 3.0, visit your nearest reseller, call Claris at 1-800-293-0617 ext. 1156, or visit us on the Web at <http://www.claris.com>.



Mac OS



Simply powerful software.™

In Canada, please call 1-800-361-6075 ext. C148

© 1996 Claris Corporation. All rights reserved. Claris, FileMaker, and ScriptMaker are registered trademarks and Powerful Software is a trademark of Claris Corporation in the U.S. and other countries. The Mac OS logo is a trademark of Apple Computer, Inc. Microsoft is a registered trademark and Windows and the Windows logo are trademarks of Microsoft Corporation. All other trademarks are property of their respective owners.

"READY TO RUN" WEB SERVER



12 years of experience,

ProGen has been continuously introducing new state-of-the-art products.

With our pre-installed Internet Information Server software*,

ProGen's latest model DiscoverMPEG and Nova take professional

PC computing to a new level of sophistication. With a

"Ready-to-Run" Web Server from ProGen Systems, we bring the world closer to you.

* Internet Information Server Software is free with purchases of Windows NT™, please call for detail package pricing.

Discover MPEG

- Genuine Triton Chipset by Intel
- 16 MB EDO RAM
- 256K Pipelined Burst
- 1.2 GB Fast enhanced IDE Hard Drive
- New Gold 64V+ 2 MB EDO (S3 Trio 64 V+), MPEG, Cinepak
- New WavePlayer 16-bit, 32 voice sound card
- 28.8 FAX/Modem w/Voicemail
- Fast 6X EIDE CD-ROM Drive
- 1.44 MB 3.5" Floppy Disk Drive
- 4-device Bus Mastering Enhanced IDE Controller
- Microsoft Windows® 95 CD & Manual
- 15", .28dp PnP monitor
- 104-key Enhanced Keyboard for Windows® 95
- Genuine Microsoft Mouse 2.0
- 80W PMPO Amplified Stereo Speakers
- Lotus SmartSuite 96
- 20 Software Titles, L/R Handed Game Pad



100 MHz **\$1649**
 — \$65/mo. 36-month lease in most states
 133 MHz **\$1749**
 — \$69/mo. 36-month lease in most states
 166 MHz **\$1999**
 — \$79/mo. 36-month lease in most states

Nova

- Genuine Intel ATX Motherboard
- 16 MB RAM (up to 128 MB)
- 256K Internal L2 Cache
- 1.6 GB Fast EIDE Hard Drive
- New ATI Mach64 VT 2 MB
- Fast 6X EIDE CD-ROM Drive
- Creative Sound Blaster 16 Vibra PnP
- 1.44 MB 3.5" Floppy Disk Drive
- 28.8bps Telephony FAX/modem
- MS-Windows® NT Workstation v3.51
- 17", .28dp PnP monitor
- 104-key Enhanced Keyboard for Windows® 95
- Genuine Microsoft Mouse 2.0
- 80W PMPO Amplified Stereo Speakers



150 MHz **\$3149**
 — \$116/mo. 36-month lease in most states
 180 MHz **\$3299**
 — \$122/mo. 36-month lease in most states
 200 MHz **\$3399**
 — \$125/mo. 36-month lease in most states



ISDN & SCSI Solutions are available

1-800-848-1353

CIRCLE 284 ON READER SERVICE CARD

ProGen
 SYSTEMS
 A Division of ProGen Technology Inc.

ProGen Technology, Inc. 15501 Redhill Avenue, Tustin, CA 92680 Ph: 714/566-9200 Fax: 714/566-9267 BBS: 714/566-9255 E-Mail: progen@ix.netcom.com.
 ©1995 ProGen Technology, Inc. Intel Inside and Pentium Processor logo are registered trademarks of Intel Corporation. All other trademarks are the property of their respective owners. Prices are subject to change without notice.

THE NEW STANDARD IS HERE

Windows 95
Compatible



ONE SCSI DRIVE BOTH 4X CD-ROM AND REWRITABLE OPTICAL

It's the Phasewriter Dual™ with PD technology from Toray and it transcends existing standards with more flexibility than any other optical drive. Phasewriter Dual reads CD-ROMs at quad speed and reads or writes to optical disks at a blistering .87 MBytes/second transfer rate. Just drop a CD-ROM into our new Phasewriter Dual or switch to a 650 MByte single-sided rewritable disk for portable data exchange. The Phasewriter Dual is setting new standards with higher capacity and CD-ROM compatibility at a much lower cost.

And it's Fast, Fast, Fast!

Plug this drive into any platform hardware or network and you're ready to go.

The single front loading tray holds CD-ROMs or Toray's CD-size rewritable optical (PD) disks. Because it is a SCSI drive, the software identifies and mounts either media automatically.

For information on drives, media or the retailer nearest you, call **1-800-TORAY-PD**.

PHASEWRITER 

by

'TORAY'

email: info@toray.com Internet: <http://www.toray.com>
©1995 Toray Marketing & Sales (America), Inc.

Arlington Computer Products...computing solutions since 1984!

PC MAGAZINE "...Arlington offers worry-free mail order purchasing!"

PC WORLD (3/95) "Consistently the lowest prices!"

PC COMPUTING "...Courteous service and terrific technical support!"

Satellite 100CS.....\$1919

- Fast Intel 75MHz Pentium® chip
- 10.4" color dual scan
- SVGA, VL bus graphics
- 8MB RAM
- 504MB hard drive

Portege 610CT - Ultraportable featuring a 90MHz Pentium® processor.....\$3799

- 9.5" active • 720MB drive

Tecra 700 CS & CT.....BEST PRICE!

The power of a 120MHz Pentium® chip, the speed of a PCI bus, the performance of synchronous memory and the brilliance of an

11.3" display...it's here!

- large 1.2GB drive
- optional Desk Station V
- Lithium Ion battery
- optional 4X CD-ROM
- SoundBlaster Pro

Tecra 720 CDT...BEST PRICE!

133MHz Pentium® chip

- 16MB
- EDO RAM
- 6X CD-ROM
- Giant 12.1" active display



TOSHIBA

Satellite Pro 410 Series with CD-ROM!

- 90MHz Pentium® chip
- 8MB EDO RAM
- 810MB drive •11.3" color

Satellite Pro 410CS.....\$3099

- dual scan •CD option

Satellite Pro 410CDT.....\$4299

- 4X CD-ROM •active color

Targus Universal Case.....\$69

Targus Leather Case.....\$99

Targus Notepac.....\$39

EPSON®

FX870.....\$279	LQ1070+.....\$379
FX1170.....\$369	LQ1170.....\$679
LQ570+.....\$249	DFX5000+.....\$1389
LQ870.....\$429	DFX8000.....\$2299

Action 1400.....\$469

Stylus IIS.....\$179*

Stylus Color XL.....CALL

Stylus 1500.....CALL

Stylus Color II - Vivid 720dpi color

at a new, lower price!!!.....\$269*

Stylus Color Pro - lower price....PRICE DROP

Photo PC - digital camera.....CALL

Thousands of printers in stock! Most shipped same day!

*after rebate

TEXAS INSTRUMENTS

Extensa 450/450T.....\$1449/\$1899

Extensa 560CD/CDT.....\$2689/\$3649

TM5200/5300.....\$4199/\$5299

Canon

BJ-30 or BJC-70.....\$259/\$339

BJ-210/230.....\$199/\$379

BJC-610 or 4100.....PRICE DROP

NoteJet III 75/540.....\$2599

OKIDATA

600e.....\$399 ML520.....\$379

610e.....\$479 ML521.....\$499

OL810E.....\$749 ML590.....\$429

OL1200.....\$1059 ML591.....\$589

ML320.....\$309 ML395.....\$979

ML321.....\$429 ML3410.....\$1249

HEWLETT PACKARD

Laserjet IV+/IVM+.....\$1129/\$1549

Laserjet 5 - NEW!!!.....\$1299

Laserjet VL/OfficeJet.....\$519/\$489

Laserjet 5 Si or MX.....\$2819/\$3899

Laserjet 5P/MP.....\$859/\$1039

Laserjet IV V/MV.....\$1989/\$2799

2MB/4MB upgrade.....\$89/\$99

8MB/16MB.....\$179/\$299

DeskJet 600/680C.....\$199/\$319

DeskJet 820CXI/855CXI.....\$389/\$489

4P/IVC Scanner.....\$509/\$929

NETWORKING

Net 3.12 5/10/25-user.....\$619/\$1299/1799

Net 3.12 50/100/250.....\$2299/\$3399/4999

Net 4.1 10/25-user.....\$1299/\$1799

Net 4.1 50/100-user.....\$2249/\$3399

Lantastic Starter 6.0.....\$219

3 Com Etherlink III.....\$109

3 Com III 5/20-pack.....\$389/\$1399

Intel Ether 16 or Pro.....\$89

Intel Pro TP 5/20-pack.....\$329/\$1199

AMERICAN UPS

280.....\$99 Pro 420.....\$219

400.....\$149 Pro 650.....\$269

450.....\$169 Smart 450.....\$269

600.....\$239 Smart 700.....\$339

900.....\$329 Smart 1000.....\$449

1200.....\$289 Smart 1400.....\$559

CHIPS

1MB/4MB Simms.....\$39/\$99

8MB/16MB Simms.....\$179/\$299

intel OVER DRIVE

Pentium® chip 63MHz.....\$139

Pentium® chip 83MHz.....\$189

Pentium® chip 120/133MHz.....\$329

MONITORS

EIZO/NANAO

F2-15.....\$559

F2-17/17EX.....\$849/\$979

T2-17 ESP/17TS.....\$1059/\$1039

T2-20 ESP/F2-21.....\$1819/\$1799

VIEWSONIC

15GS/15GA/17GA.....\$409/479/\$729

17PS/17EA/17GS.....\$779/649/\$649

PT770/810.....\$889/\$1879

20G/21PS.....\$1159/\$1599



DX1495/1595.....\$259/\$359

DX1795/MXP17F.....\$629/\$789

DX15T/17T.....\$399/\$709

MX21F.....\$1439

PRINCETON

EO14/15.....\$249/\$339

Ultra 17 or 17+.....\$559/\$609

Ultra 20 - 1600 x 1280.....\$1069

SONY

15SFII.....\$475 17SFII.....\$859

15SX1.....\$419 20SFII.....\$1729

17SEII.....\$999 20TC.....\$3139

SCANNERS/DIGITIZERS

Epson Action Scanning II.....\$419

Epson Scan 1000/1200.....\$689/\$1059

Microtek E3 or E6.....\$369/\$549

Polaroid SprintScan 35.....\$1539

Relisys Scorpio/Taurus.....\$399/\$669

UMAX S6E/S12.....\$399/\$689

UMAX PowerLook Pro or II.....\$1399/1679

CIRCLE 336 ON READER SERVICE CARD



Accura 28.8 Int/Ext.....\$159/\$169

PCMCIA 28.8 Fax.....\$215

NEW...WITH VOICE!!!

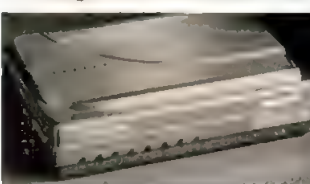
Optima 28.8 Int/Ext.....\$309/\$349

Practical 14.4 Int/Ext.....\$69/\$79

Practical 28.8 Int/Ext V.34.....\$149/\$159

U.S. Robotics

The Intelligent Choice in Information Access



Sportster 28.8 Voice with Personal Voice Mail

New Sportster Voice with Personal Voice Mail puts all the convenience of an answering machine, a speakerphone, a fax machine and a reliable U.S. Robotics modem in one compact unit. Full duplex Speakerphone lets you talk and listen to the person on the other end of the line. You also can scream at speeds of up to 33.6kbps with the #1 selling modem, Sportster!

All Sportster products (except PC card) come with a complete Internet Connection kit.

DRIVES & TAPES

Colorado Jumbo/Trakker 700.....\$159/\$319

Colorado T-1000/1000E.....\$159/\$185

Colorado Sure Store - writer.....\$979

Hitachi 4X CD.....\$99

MicroSolutions Back Quad CD.....\$299

NEC 6X/6Xe.....\$239/\$329

Seagate 1.2GB/1.6GB.....\$219/\$279

Seagate 2GB.....\$319

Sound Blaster CD 8X.....\$399

West Digit 1.2GB/1.6GB.....\$219/\$269

West Digit 2GB/2.5GB.....\$319/\$379

1.44 / Dual Floppy.....\$39/\$89

Sportster 28.8 Winmodem

Winmodem is the affordable, easy to use faxmodem made especially for your Windows-based computer. Just plug Sportster Winmodem into your PC, and it's ready to take you anywhere. With proven U.S. Robotics technology, the performance is exceptional! Also, Sportster Winmodem is software upgradeable! Just dial up U.S. Robotics and new features will come to you in seconds!

The Connections CD-ROM

Includes an amazing selection of Internet, communications, entertainment and productivity software all for FREE with your Sportster!!

Sportster 28.8 int/ext.....\$169/\$179

Sportster 28.8 Winmodem.....\$139

Sportster 28.8 Voice int.....\$179

Sportster 28.8 Voice ext.....\$189

Sportster 28.8 DSVD.....\$269

Sportster 28.8 PCMCIA w/data.....\$259

Courier 28.8 int/ext.....\$329/\$359

Arlington
Computer
Products, inc.

Hours and locations subject to change without notice. Qualified purchase order required. No exchange for charge card.

851 Commerce Court, Dallas, Texas, 75202

HOURS (CENTRAL TIME)

7:30am - 8:30pm / Monday thru Friday

8:30am - 5:00pm / Saturday

800-548-5105

Shipping \$47-\$61-\$89

Toll-free 800-548-5105

1-800-548-5105

1-800-548-5105

PC Solutions

TIPS AND TECHNIQUES TO INCREASE YOUR PRODUCTIVITY

User-to-User

By Neil J. Rubenking

Quick DOS Access in Windows 95

I have Windows 95 installed on my system, but I'm still a DOS diehard. Happily, I discovered an easy way to launch a DOS session from any folder. Open any folder and select View | Options from the menu. Click on the File Types tab in the Options window, then scroll down the list of Registered File Types and choose Folder. Double-click on Folder or press the Edit command button, then select New. Type "Shell to DOS" in the Action line and type "c:\windows\command.com /K cd" in the "Application used to perform action" line. (Note that the K following the slash must be uppercase.) Select OK and close all windows.

You have now added "Shell to DOS" as an option to the right-click menu for folders. When you select this option, Windows 95 launches a DOS session with the active folder as the current directory.

DOUGLAS CLINE, via the Internet

PC MAGAZINE: Many of us have survived version after version of DOS, learning the arcane syntax for dozens of powerful DOS commands. When we need to manipulate files, we reach for a DOS box. Adding this handy item to the right-click menu for Windows 95 folders puts these commands just a mouse click away.

Of course, if your Windows 95 directory is not "c:\windows," you'll have to substitute the correct directory. In fact, in most cases you can just use "command.com /K cd". The defined purpose of the /K switch is to execute the command that follows and leave command.com running. In this case, it simply serves to suppress the multiline Microsoft copyright notice that would otherwise be displayed.

Another Hidden Windows Keyboard Shortcut

I just saw the item in the column of January 23, 1996, about keyboard shortcuts in File Manager. Under Windows 3.x, as well as any old-style dialog boxes still found in Windows 95 (like the Install New Fonts dialog in Control

Panel's Fonts applet), Ctrl-<Slash> selects every file on the list. This must be one of the least documented, most useful shortcuts in history. It's very annoying that nothing like this exists in the new common dialog boxes.

ED MENDELSON, via ZD Net

PC MAGAZINE: The Ctrl-<Slash> keyboard shortcut is actually part of the keyboard interface for any multiple-choice list box. List boxes, like push buttons, check boxes, and edit boxes, are user interface elements built into Windows itself. In Windows 3.x, the common dialogs use a list box to hold filenames, and thus the Ctrl-<Slash> keystroke works. List boxes are present in Windows 95 as well and, as Mr. Mendelson noted, they still support the Ctrl-<Slash> shortcut.

In Windows 95, however, the common dialogs use a more advanced control, called a list view. This control can display the file list in a number of different ways, including the icon associated with each file. It does not implement the Ctrl-<Slash> keyboard shortcut, however. Many programs, including Explorer, do, however, use Ctrl-A to select all files in a list in Windows 95. Without leaving the Windows 95 file common dialog, you can rename a file or create a new directory. One click chooses between a file-and-icon list and a list with complete details. And clicking on any column heading in the details list sorts by that column. These added features surely outweigh the loss of the Ctrl-<Slash> shortcut!—Neil J. Rubenking

Fastest Windows 95 Restart

Regarding the User-to-User column of February 6, 1996, the methods described for restarting Windows 95 are okay, but if you really just want to restart Windows without rebooting, it's fairly easy.

Click on Start and select Shut Down. Select "Restart the Computer?" from the dialog box and then, while holding down the Shift key, click on Yes. Windows 95 will restart without rebooting the PC. Note that you should hold down the Shift key until the screen goes blank, then let it up. Otherwise, Windows will stay in limbo until you release it.

BOB ROUSE, Lilburn, GA

HIGHLIGHTS



HARDWARE If your printer doesn't have a page-eject button, don't despair: There is a software solution that serves the same function. Page 312



DATABASES Microsoft Access offers no built-in spinner controls, but there is a way to simulate them on your own. We tell you how to do it and what the advantages are. Page 322



GRAPHICS Find out what pre-mastering software is and why you'll need it if you want to make high-quality recordings on CDs. Page 330

OUR ADVISORS

Douglas Belling is a contributing editor and the author of many PC Magazine utilities.

Frank J. Dorfner, Jr. is senior networking editor and the author of the PC Magazine Guide to Connectivity.

Alfred Poor is a contributing editor and the author of The Underground Guide to Hardware.

Brian Proffitt is a senior contributing editor to OS/2 Magazine and author of OS/2 Warp Survival Kit.

Jeff Prossie is a contributing editor and the author of DOS 6 Techniques & Utilities.

Sal Ricciardi is a contributing editor and the author of the Running FoxPro series from Microsoft Press.

Neil J. Rubenking is technical editor and author of Delphi Programming for Dummies.

Luisa Simone is a contributing editor and the author of Microsoft Publisher by Design.

Craig Stinson is a contributing editor and coauthor of Running Windows 3.1 and Running Microsoft Excel.

M. David Stone is a contributing editor and coauthor of Word for Windows Companion, Second Edition.



PC DIRECT starts here with exciting offers from top direct vendors. See index, page 312

PC MAGAZINE: PC Magazine has well over a million readers, and it seems that about half of them wrote to me about this faster method for restarting Windows 95. Until this letter arrived, however, I had the impression that the Shift key technique for restarting Windows 95 was unreliable. In fact, I was simply failing to hold down the Shift key long enough. I have yet to find a system that doesn't restart successfully when you hold down the Shift key until the screen goes black and the words "Windows is now restarting" appear on the screen.

Just how much time you'll save depends on your system, but chances are good that you'll get Windows 95 restarted in about half the time it would take to reboot. Not only that, but if you use an operating system loader like System Commander or the Windows NT Boot Loader, the Shift key restart bypasses it and goes directly back into Windows 95.

The Windows 95 Easter Egg

In the Tutor column of December 19, 1995, Jeff Proise mentioned a hidden feature in Windows 95: An animated, music-accompanied display of the Windows 95 Product Team's credits will be shown if you precisely follow a lengthy, error-prone procedure. The

feature is disabled, though, once you exit and restart Windows 95. To reenable it, you have to repeat the entire procedure.

I tried to create a batch file to automate the task of creating and renaming the folder, but I couldn't get it to work; it seems that keystrokes must be fed manually to the Windows shell in order to trigger the hidden feature.

Because the Windows Recorder can record and play back keystrokes, I recorded a macro of the entire procedure, then played it back. The macro worked fine, just as if I'd entered the keystrokes manually.

KEVIN YIP, Flushing, NY

PC MAGAZINE: The Windows 95 "Easter egg" has been the subject of much debate. Some readers want a better, faster way to show the credit screen. Others resent the fact that disk space and processing power are devoted to this frivolous activity and want to get rid of it.

Mr. Yip's Recorder solution should satisfy the first group. Those who lost RECORDER.EXE by letting Windows 95 completely replace Windows 3.1 can surely find a copy. PC Magazine Online offers the file EASTER.REC for download. This is a Recorder macro file that has been cleaned up and streamlined using our RECEDIT utility. Close or minimize all open programs to give the macro access to the desktop, then load EASTER.REC into

Recorder and run the single macro it contains.

Microsoft confirmed that the only way to hatch the Easter egg is by performing the elaborate ritual of creating and renaming the folder, either by hand or by using an equivalent macro. A batch file won't do the job, nor will any program that calls on DOS or Windows functions to create and rename the special folder.

As for those who despise the frivolous waste of resources, I checked with Microsoft to see just how much is consumed. Variables within SHELL32.DLL indicate whether the renaming ritual has been performed. These variables use a piddling 8 bytes of memory. The code that creates the credits folder is under 2K, and it resides in memory only when the credits are running. And the MIDI file that provides the background music is compressed to under 8K and stored inside SHELL32.DLL. When the Easter egg is invoked, this file is decompressed and stored as the 36K CLOUDS.MID in the Media directory below the main Windows 95 directory. You can freely delete the file, but it will be re-created if you display the Easter Egg again.

In short, if you never invoke the Easter egg, it uses roughly 10K of disk space and almost no memory. There's no way to remove it from your system completely, but the cost is not as great as most readers expected.

FACTORY AUTHORIZED OUTLET SALE!

Seagate	CONNER	IBM	Quantum	Maxtor
Desktop Storage Value!		High Performance SCSI Drives		
MAXTOR 420 MB E-IDE \$139 11 ms Seek QUANTUM 420 MB SCSI \$145 11 ms Seek MAXTOR 540 MB E-IDE \$165 11 ms Seek CONNER 540 MB E-IDE \$170 14 ms Seek QUANTUM 535 MB SCSI \$165 9 ms Seek SEAGATE 630 MB F-ATA \$169 11 ms Seek SEAGATE 850 MB F-ATA \$188 14 ms Seek QUANTUM 840 MB E-IDE \$187 11 ms Seek QUANTUM 850 MB SCSI \$189 11 ms Seek QUANTUM 1080 MB E-IDE \$249 11 ms Seek QUANTUM 1280 MB E-IDE \$226 10 ms Seek WESTERN DIGITAL 1280 MB E-IDE \$237 10 ms Seek CONNER 1060 MB SCSI \$245 9 ms Seek CONNER 1275 MB E-IDE \$243 14 ms Seek SEAGATE 1200 MB F-ATA \$229 10 ms Seek WESTERN DIGITAL 1600 MB E-IDE \$249 10 ms Seek		A/V • Disk Array • Network Server SEAGATE 2.5 GB Barracuda 2 \$655 8 ms Seek • 7200 • 1024K Buffer CONNER 2.1 GB \$635 8 ms Seek • 7200 • 1024K Buffer QUANTUM 2.1 GB Atlas \$645 8 ms Seek • 7200 • 1024K Buffer SEAGATE 4.3GB Barracuda 4 \$1075 8 ms Seek • 7200 RPM • 1024K Buffer CONNER 4.3GB 42075 \$895 8 ms Seek • 7200 RPM • 512K Buffer QUANTUM 4.3GB Atlas \$957 8 ms Seek • 7200 RPM • 2048K Buffer SEAGATE 9.0 GB Elite \$1975 10 ms Seek • 5400 • 1024K Buffer		
Tape Backup Drives		SCSI Fast & Wide Drives		
Hewlett Packard 2-4GB C35470A SCSI \$895 3-5GB C35480A SCSI \$995 4-8GB C1533A SCSI \$1095 Includes Novaback Software and 1 piece of media		SEAGATE 2.5 GB Barracuda 2 Wide \$755 8 ms Seek • 7200 • 1024K Buffer QUANTUM 2.1 GB AtlasWide \$735 8 ms Seek • 7200 • 1024K Buffer SEAGATE 4.3GB Barracuda 4 Wide \$1175 8 ms Seek • 7200 RPM • 1024K Buffer QUANTUM 4.3GB Atlas Wide \$1057 8 ms Seek • 7200 RPM • 2048K Buffer SEAGATE 9.0 GB Elite Wide \$2075 10 ms Seek • 5400 • 1024K Buffer		
CD ROM & CD WRITERS		adaptec		
4x TOSHIBA CD ROM (IDE) \$149 160 MS seek, 256 K Cache/Try Design 4x TOSHIBA CD ROM (SCSI) \$199 160 MS seek, 256 K Cache/Try Design 4.4x PIONEER 6 CD Changer (SCSI) \$375 110 MS seek, 876 KB/Sec. Transfer 6x Toshiba CD ROM (SCSI) \$395 102 MS seek, 256 K Cache 4 x Yamaha CDE 100 (SCSI) \$1875 4 x CD writer/MultiSession/Selectable Speed 4 x PIONEER DW-5114X (SCSI) \$1895 4 x CD writer/614KB/sec/MultiSession Prices are external and include all cables and recording software for a PLUG & PLAY Solution.		1522A \$85 ISA to Fast SCSI 2, 16Bit 1522K \$140 ISA to Fast SCSI with driver and cable 16Bit 1542C \$180 ISA to Fast SCSI 2, 16 Bit 1542CK \$215 ISA to Fast SCSI 2 with driver, cable, 32 Bit 2742W \$350 EISA Fast/Wide with driver & cable, 32 Bit 2940K \$245 32Bit PCI fast SCSI 2 Controller, driver & cbl 2940WK \$285 PCI Fast Wide SCSI 2 controller, driver & cbl		
SCSI Enclosures		SCSI Enclosures		
Call for unbeatable prices on multibay enclosures. Available in standard SCSI, high density, and fast and wide interfaces		All prices & specifications are subject to change without notice. All quoted prices are subject to a 10% handling charge. International customers pay all shipping charges. All enclosures include on-board active termination and an exclusive push button power switch conveniently located on the front bezel. External price add \$60.00		

FREE!
UPS SHIPPING ON ALL
DOMESTIC ORDERS.

NEW! CALL FOR OUR NEW DATA
SUPPLIES CATALOG

INK Jet/Laser Supplies American Inkjet Apple Canon Epson Hewlett Packard IBM ImagePlus Renewable Resources Texas Instruments Magnetic Media Diskettes 3M Bull/General Fuji Maxell Sony Verbatim	Optical /CD-R 3M Fuji Hewlett Packard Panasonic Philips Pioneer Pionner RICOH Sony Verbatim Streamer Cassettes/ Audio/Video Maxell Sony QIC Wide /DAT Tapes Removable Cartridges DAT Tapes (4mm & 5mm) 1/4" Data Cartridges 1 2" Tape Batteries Rayovac
--	---

ALL OF THIS AND MORE! CALL TODAY

ProDirect

VISA MasterCard DISCOVER AMERICAN EXPRESS

•NEVER A SURCHARGE!
•NO SALES TAX!
•SAME DAY SHIPPING
•90 DAY PERFORMANCE GUARANTEE ON ALL PRODIRECT HARD DRIVES!

800-555-1256

Fax 24 hours a day 612-941-1109
International orders call 612-941-1805
E-Mail PDISALES@aol.com

7 secrets you need to know about your data

All new for
Windows 95
& NT 3.51!

1 You need the big picture to make good decisions. With SPSS' statistical charts, you can better understand your data. In this boxplot, you see the average, minimum, maximum and distribution all at the same time.

2 You need to know when there's a problem with your data. SPSS helps you spot data entry errors or unusual data points that you may want to leave out of your analysis – or look at more closely.

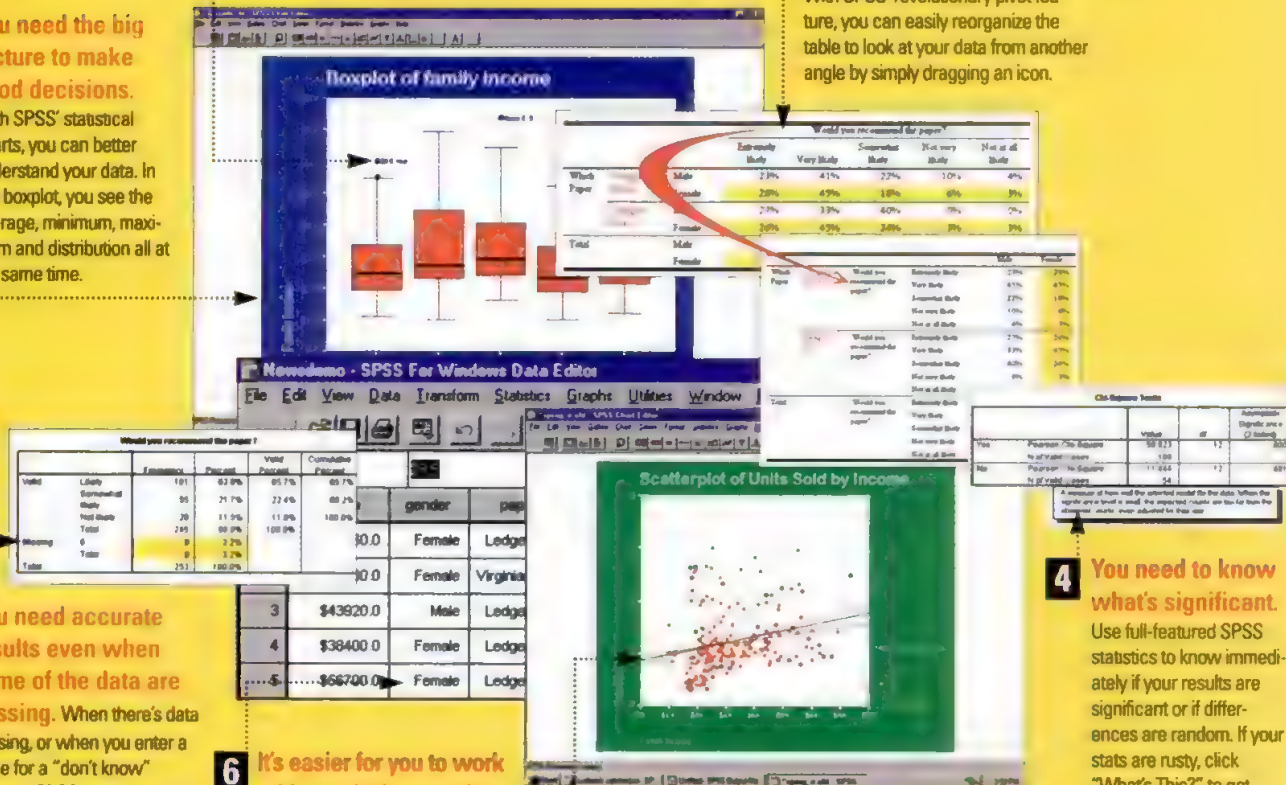
3 You need to look at the data more than one way. When you create a report, what you see often leads to more questions. With SPSS' revolutionary pivot feature, you can easily reorganize the table to look at your data from another angle by simply dragging an icon.

7 You need accurate results even when some of the data are missing. When there's data missing, or when you enter a code for a "don't know" answer, SPSS can adjust calculations accordingly.

6 It's easier for you to work with words than numbers. Within a familiar row-and-column setting, SPSS lets you work with words instead of confusing codes – and still do calculations. Your labels are automatically applied to your graphs and reports for clearer, faster presentations.

5 You need to separate the apples from the oranges. SPSS lets you quickly and easily run reports and graphs for different groups so you can look at them separately or compare them.

4 You need to know what's significant. Use full-featured SPSS statistics to know immediately if your results are significant or if differences are random. If your stats are rusty, click "What's This?" to get explanations, definitions and rules of thumb for statistics or results.



SPSS gives you Real Stats. Real Easy. SPSS is a complete tool kit of easy-to-use statistics, graphs and reports that will help you unlock the secrets hidden in your data. Enter your data or directly import it from spreadsheets, databases or ASCII files. SPSS is used for:

Survey research ■ Marketing and sales analysis ■ Quality improvement ■ Research of all types

We're not saying you should give up your spreadsheet or database. But, when you're ready to go beyond simple summaries and basic row-and-column math to get the information you really need, you're ready for SPSS 7.0 for Windows.

Call 1(800) 543-5833

or fax 1(800) 841-0064

Outside the United States:
call +1 (312) 329-2400
or fax +1 (312) 329-3668

Visit our site on the
World Wide Web:
<http://www.spss.com>
or e-mail: sales@spss.com



CIRCLE 043 ON READER SERVICE CARD

To order or for more information

Call 1(800) 543-5833

or Fax 1(800) 841-0064

or mail to: SPSS Inc.
444 North Michigan Avenue
Chicago, IL 60611

American Express, Discover, MasterCard
and VISA accepted

A5833

Athens • Bologna • Chicago • Gonnheim • London • Madrid • Munich • New Delhi • Paris • Singapore • Stockholm • Sydney • Tel Aviv • Tokyo • Washington, DC
And distributors worldwide • Outside the United States: call +1 (312) 329-2400 or fax +1 (312) 329-3668

Name _____
Title _____
Organization _____
Address _____
City _____ State _____
ZIP _____ e-mail _____
Phone Number () _____
FAX Number () _____



SPSS
Real Stats. Real Easy.™

5 Star Highlights

"Wide selection and quick delivery are this company's stock and trade."

PC Computing Magazine

1. HIGHLY TRAINED SALES TEAM!

Let our professional sales team help you with all your computer needs. All of our representatives are technically trained to service you better.

2. SATISFACTION GUARANTEED!

Here at Midwest Computer Works we're dedicated to delivering nothing but the finest name brand computer equipment at the lowest possible prices. A No-Hassle Money Back Guarantee lets you know that no sale is complete until YOU'RE satisfied.

3. INCREDIBLE SELECTION!

With over 30,000 different items from cables to computers, you can be sure that what you want is IN-STOCK and ready for immediate delivery.

4. LOWEST PRICES!

Our tremendous buying power means savings to you on all major brand computers, software and peripherals, simply put, we save you money without sacrificing service!

5. EASY PAYMENT TERMS!

We accept all major credit cards, COD's, purchase orders, pre-payments and offer flexible leasing options.

OVERNIGHT SHIPPING



**FedEx
FREE**

Supercharge your computer's performance with RAM upgrades. If you don't see your system listed, call today. We offer hundreds of upgrades for PC computers, laptops, portables, printers and more.

Partial memory deals*

simple
TECHNOLOGY

MEMORY
MAXIMIZER

PC

AST
TECHNOLOGY

HEWLETT
PACKARD CONT

Ascenta 900N, 910N	4MB	\$175
Ascenta 900N, 910N	8MB	\$350
Ascenta 900N, 910N	16MB	\$625
Ascenta 950N	8MB	\$349
Ascenta 950N	16MB	\$625

LaserJet 5L	8MB	\$325
LaserJet 5P, SMP	16MB	\$499

IBM

COMPAQ

Contura 400CX, 410CX	4MB	\$175
Contura 400CX, 410CX	8MB	\$342
Contura LTE Elite	4MB	\$195
Contura LTE Elite	8MB	\$365
Contura LTE Elite	16MB	\$630
Contura LTE 5000	8MB	\$315
Contura LTE 5000	16MB	\$599

ThinkPad 701C, CS	8MB	\$369
ThinkPad 755	4MB	\$209
ThinkPad 755, 760	8MB	\$349
ThinkPad 760	16MB	\$659

NEC

Versa E, V, M, P Series	4MB	\$189
Versa E, V, M, P Series	8MB	\$369

TOSHIBA

HEWLETT
PACKARD

LaserJet 4P, 4M, 4V, 5P, SMP	4MB	\$120
LaserJet 4P, 4M, 4V, 5P, SMP	8MB	\$229
LaserJet 4Si, 4SiMX	4MB	\$159
LaserJet 4Si, 4SiMX	8MB	\$319
LaserJet 5L	4MB	\$169

T2100, 2105, 2110, 2130	4MB	\$169
T2100, 2105, 2110, 2130	8MB	\$339
T2100, 2105, 2110, 2130	16MB	\$769
T400, T410, 601	8MB	\$425
Tecra	8MB	\$459
T2400/CS, /CT, T3400	8MB	\$359

SIMM Modules

• 1MB or 4MB x9 70 • 2MBx32 or 36 70
Call for latest pricing! • 1MBx32 or 36 70 • 4MBx32 or 36 70

LOWEST INDUSTRY PRICING AVAILABLE!

24-Hour FAX Line 1-847-459-6933
International Line 1-847-459-6884
Customer Service 1-847-459-9410
Technical Support 1-847-459-9411

ORDER DEPARTMENT
1-800-859-6757

DESKTOPS

Wyse Terminals... ALL MODELS IN STOCK

AST	
Bravo MS P-100 1 2GB 16M	1629
Bravo MS P-120 1 6G 16M	1785
Bravo MS P-166 1 6G 16M	2299

Canon	
9140 P-100 1.275G 8M 6X-CD 14 FAX	1469
9150 P-100 1.275G 8M 4X-CD/Changer 28 B	1675
9330 P-133 1 6G 16M 6X-CD 28 B	2260

COMPAQ	
COMPAQ AUTHORIZED SERVICE CENTER	
ProLinea E Pentium 75 1 06G 8M	1449
ProLinea E Pentium 100 630M 8M	1449
ProLinea E Pentium 100 1 06G 8M	1569
ProLinea E Pentium 120 1 06G 8M	1695
ProLinea E Pent. Pro 150, 1.08G 16M 4XCD	4092
ProLinea E Pent. Pro 190 16M 4XCD	4199
ProLinea Mini-Towers • "New Models in Stock"	
Desktop 5150 P-150 2G 16M	3280
Desktop XL 5133ML P-133 1 05G 16M	3569
PRO 486 1500 4500 Series	BEST PRICES
PRO 386/486 Series	BEST PRICES

IBM	
PC330 P-100 540M 8M	1520
PC330 P-133 1 2GB 16M	2125
PC350 P-166 1 2G 16M	2889

NOTEBOOKS

AST	
Ascenta 950 Pent. 90 1 2G 10.4" Psv Ctr	2499
Ascenta 950N Pent. 90800M 10.4" Act Ctr	2620
Ascenta 950N Pent. 90 1 2G 8M 10.4" Act	2855
Ascenta 950N Pent. 120 1 2G 11.8" Act Ctr	4775
Ascenta J Pent. 100 800M 10.4" Psv 10.4" 50-Pin	2665
Ascenta P-P-133 1 2G 8M 4xCD 11.3 Act	4769

Canon	
NoteJet IIICX P-90 810M 11.8" Act Ctr	5512
NoteJet IIICX P-120 1 2GB 8M 11.8" Act	6699

COMPAQ	
Contura 420CX DX4/75 420M 10.4" Act Ctr	2479
Contura 430CX DX4/100 720M Act Ctr	2872
Lie 5000 MS10 P-75 510M 10.4" Psv Ctr	2859
Lie 5200 P-120 1 35G 10.4" Act Ctr	4769

NEC	
Versa 4050C P-90 810M w/CD 10.4" Actv Ctr	4394
Versa 4080H P-120 1G 8M 4xCD 10.4" Act	4879

SHARP	
CALL FOR OTHER 9000 SERIES MODELS!	
PC-9070 P-133 1GB 8M 12.1" Actv Ctr	5699

TEXAS INSTRUMENTS	
Extensa 450T DX4/75 340M Act Ctr	1440
Extensa 560CD P-75 810M PCI 10.4" Psv 4xCD	2699
Extensa 550CDT P-75 810M 10.4" Actv w/CD	3545
TMS100 Pentium 90 1.2G PCI 10.5" Actv	3348
TMS300 Pentium 133 1.2GB 8M 11.3" TFT	5299

MONITORS

Amdak 14" White VGA Monochrome	119
Philips Brilliance 15A w/Audio + mc 28	412
Samsung 17GLS1 17" 1600x1200 26mm	835

GoldStar	
1465DLS 14" 1024x768 28mm	249
1727 17" 1280x1024 28mm	669

MITSUBISHI	
Diamond Pro17HX 17" 1280x1024 26mm	849
Diamond Pro21TX 21" 1600x1200 30mm	1789
MegaView Series	CALL

VISIONMASTER by VIEWSONIC	
MF-881TE 17" 1280x1024 26mm	739
MF-8221E 21" 1600x1200 28mm	1895
MT-9021E 21" 1600x1200 30mm	1789

mag	
DX1595 15" 1280x1024 28mm	374
DX1795 17" 1280x1024 26mm	665
DX15T 15" 1280x1024 25mm	465
DX17T 17" 1280x1024 25mm	759

MAGNAVOX	
BM1414 14" VGA Mono 720x400	109
CM2099 14" VGA 1024x768 28mm	245
CM2045 15" EVGA 1024x768 28mm	320
CM4018 17" Autocan 1280x1024 28mm	595
20F404 20" Autocan 1280x1024 31mm	999

NANAO	
F2-15 15" 28mm 1280x1024 TCO	585
F2-17 17" 28mm 1280x1024	865
F2-17EX 17" 26mm 1600x1200 TCO	475
T2-17TS 17" 25mm 1600x1200 TCO	1099
T2-17 25mm 1280x1024 TCO	1399
T2-20 20" 30mm 1280x1024 TCO	1799

NEC	
XV15+ / XV17+	469 / 799
XE21	1765
XP17 / XP21	1020/2130
C500 15" 28 PnP 1280x1024	175
M500 15" 25 1280x1024	569
M700 17" 25 1280x1024	845

NOKIA	
449E 15" 1280x768 28mm	449
447L 17" 1280x1024 28mm MPRII	689
447X 17" 1600x1200 25mm MPRII	929
445X 21" 1600x1200 25mm MPRII	1899

SONY	
CPD-15SX1 15" 1280x1024 25mm	409
CPD-15SF2 15" 1280x1024 25mm	469
CPD-17SF2 17" 1280x1024 25mm	849
CPD-20SF2 20" 1280x1024 25mm	1749
GDM-17SE2T 17" 1600x1200 25mm	1049

ViewSonic	
V15ES 15" 1024x768 28mm	379
V17EA 17" 1024x768 27mm	649
V21PS 21" 1600x1200 25mm	CALL

PRINTERS

Canon	
BJ-10SX	212
BJ-30 / BJC-70	255/349
BJC-210	360dpi 199
BJC-410 720x360dpi Color	299
BJC-610 720dpi Color	429
LBP-1260 12ppm 600dpi	1349

EPSON	
LQ1070+ / LQ1170	384/682
Stylus 1000	474
Stylus IIS/Stylus Color II	212/305
Stylus Pro XL (12.5"x18")	1789

FARGO	
Fotolun 3x5 color printer	383
Primera Pro	1339
Primera Pro Postscript	1849

HEWLETT PACKARD	
DeskJet 600 Mono / DeskJet 660C	200/343
DeskJet 680C / DeskJet 850C	315/453
DeskJet 820 / DeskJet 855	385/505
DeskJet 1800C/DeskJet 1800CM	1299/1969

LaserJet 4+ 12ppm 600dpi	1399
LaserJet 4M+ 12ppm 600dpi	1935
LaserJet 4V 16ppm 600dpi 11x17	1915
LaserJet 4MV 16ppm 600dpi 11x17	2772
LaserJet 5LFS 16ppm 600dpi	489
LaserJet 5P 6ppm 600dpi	845
LaserJet 5MP 6ppm 600dpi Pstscript	999
LaserJet 5M NEW	1769
LaserJet 5N 12ppm 600dpi, e-net	1529
LaserJet 5SI 24ppm	2779
LaserJet 5SIMX 17ppm 600dpi	3892
Color LaserJet 5	5915
OfficeJet LX (Printer FAX & Copier)	689
CopyJet Color Inkjet	2339

SEE PACIFIC DATA FOR JETDIRECT SAVINGS!

LEXMARK	
Optra E 6ppm 1MB 600dpi	575
Optra R+ 12ppm 2MB 1200dpi	1419
Optra LXI+ 16ppm 8MB 1200dpi	2865

OKIDATA	
184 Turbo	225
320 / 321	319/442
520 / 521	379/489
590+ / 591+	439/599
395 / 395c	999/1099
600e/610e/610ePS	399/489/699
Laser 810 LED 8ppm/1200	759/1099
OkJet 2010 COLORIII	325

Panasonic	
KXP-3626 / KXP-3696	409/449
KXP-8500 / KXP-8500	429/CALL

QMS	
MagiColor Laser CX	5383
SEIKO SII	
Smart Label EZ30	139

DRIVES

CD-ROM DRIVES	
Goldstar GCDR5608 6X CD EIDE	109
Chicon CDS-5451 4x 230ms EIDE int	92
Microsolutions 4X Par Port	269
NEC 6X1 / 6XE	244/342
NEC 4x4 CD Changer EIDE	265
Panasonic KXLD-740 2 PCMCIA	399
Pioneer DRM 624X 6 Disk Changer	284

PINNACLE MICRO	
Pinnacle Micro Rec. CD-ROM ext	1339
Pinnacle Micro RCD-1000 PCI int	1172

PLEXTOR	
Plextor 4Plex 4x 170ms SCSI-2 int	260
Plextor 4Plex + 4x ext. w/o cnlr PnP	340
Plextor 6Plex 6x 145ms SCSI-2 int	289

SONY	
CSD-760E 4x ATAPI int	99
CSD-760S 4x SCSI-2 int	149
PRD-150 Discman 2x port. int.	332
PRD-155SB Discman w/16-bit Sound	559
Spressa - CSP920S Rec. CD int.	833
Spressa - CSP921S Rec. CD ext.	1159

TOSHIBA	
Toshiba XM3701BS SCSI int.	249
Toshiba TXM3701D1 67X ext.	329
Toshiba XM5302B 4X w/ATAPI int	203

REMOVABLE STORAGE	
IOmega Ditto 800 800MB parallel	145
IOmega Ditto 3200 3.2G int. Travan	285
IOmega Ditto 3200 3.2G Parallel	289
IOmega Zip Drive - IN STOCK	199
IOmega Jaz 1 GB int.	475
Panasonic LF 7304 1.5GB int.	1219
Pinnacle Micro Tahoe 230M int. int.	675
Pinnacle Micro Sierra 1.3GB PC int.	1365
Syquest EZ135 int.	185
Syquest 200MB Value kit int.	599

HARD & FLOPPY DRIVES	
Fireball 1280 1 28G FATA	229
Maxtor 71826AP 1 8G EIDE	279
Microsolutions Par. Port Floppy	155
Microsolutions Backpack 1 2G Par	439
Quantum Bigfoot 1 28G FATA	227
Quantum CM3400 4.2GB SCSI	999
Seagate ST5108A 1GB ATA 225	219
Seagate ST3630A 630M ATA	189
Sony 1 44MB 3.5" Floppy	39
Teac FD505 Dual Floppy	95

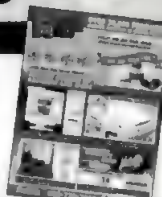
CONNER	
CFS850A 850M IDE	204
CFS1275A 1 2GB IDE	235
CFP1080S 1 08GB SCSI	279

MICROPOLIS	
4221 2 1GB SCSI	652
1991W 9 09 Wide	2199

WESTERN DIGITAL

✓ Comprehensive Technical Support

**CALL FOR A
FREE
CATALOG!**



POWER PROTECTION

APC
AMERICAN POWER CONVERSION

**\$25,000 Lifetime
Equipment Protection
on All UPS!**

BACK-UPS PRO PnP SERIES
APC introduces the world's ONLY
Plug-and-Play UPS with PowerChute

**YOUR APC
HEADQUARTERS**

UPS's
STARTING
\$999

microPS
Safeguard your system

SMART-UPS SERIES

Smart UPS 1200	1437.23	Performance Power Management for Advanced Business Networks!	
Smart UPS 1500	1893	Smart UPS 450/700	275
SMART UPS VS SERIES		Smart UPS 140/200	594.102
Includes World's Best Surge Protection		Smart UPS 2000	118
Includes PowerChute Software		SURGE SUPPRESSORS	
Includes PowerChute Power Management & Diagnostic Software for networks!		Protect Net Network Cable Protector	
Smart UPS 1000	994.00	Personal SurgeMaster 300	100.00
Smart UPS 1200	1299.00	Personal SurgeMaster 350	110.00
Smart UPS 1500	1599.00	Personal SurgeMaster 400	120.00
Smart UPS 2000	2299.00	UPS MANAGEMENT SOFTWARE	
Smart UPS 2500	2999.00	PowerChute Power Management	99.00
Smart UPS 3000	3599.00	PowerChute Power Management	99.00
THE WORLD'S ONLY BUILT AND PLAY UPS			




Polaroid



Sprint Scan 35

Fastest Film Scanner

Max 2700dpi Optical Resolution
24-bit Color • Scans in under 60 sec
Full-Color Preview

\$1529

IN STOCK NOW!!

MAGNAVOX



CM4018 17" Super EVGA Color Display
17" Trinitron CRT (16" Viewable) 1280x1024 Resolution
Dot Pitch 0.28mm, OSD Front Digital Controls
Tilt Swivel Base & Interface Cable included **\$595**
Built in power management

WORKS

(1-800-859-6757)

SINGLE 810 ON HEADSET SERVICE CARD

Ask Our Advisors

HARDWARE

No-Button Blues



I have an excellent ink jet printer, but it lacks one feature: a page-eject button.

If I print only a few lines with some programs, the printer won't spit out the page. Tugging on the wet sheet or sending a string of line feeds are not practical solutions, so I wrote a 29-byte program using DEBUG that sends an eject character to the PRN device. It's so handy that I've even created an icon for it in Windows.

ZOLTAN KOVACS,

Sault Ste. Marie, Ontario, Canada

PC MAGAZINE: In an effort to simplify their printers, manufacturers have been cutting back on nonessential controls. Whether or not a form-feed button is nonessential is certainly open to debate, but clearly it's useful to have a software solution to the problem. If you're handy with DEBUG's MOV and XCHG commands, you can indeed create such an executable program, but most users aren't this adept at programming.

You might be tempted to use the DOS

ECHO command to send a form-feed character to the printer. This potential solution has the undesired effect of adding a Carriage Return/Line Feed combination at the end, resulting in a blank line at the start of your next print job (or a blank-page ejection, if your printer driver sends a printer reset command before printing, as many drivers do).

Fortunately, two equally small files can give you your form-feed function without requiring advanced programming or partial solutions. The first step is to put the form-feed command into a text file. For most printers, the command is the ASCII 12 character (created by typing Ctrl-L). Create a file named EJECT by typing COPY CON EJECT at the DOS prompt and pressing Enter. You'll get a blank line. Press Ctrl-L, then Ctrl-Z (the DOS end-of-file character), and then Enter. DOS will respond with the message "1 file(s) copied."

Now create a batch file—call it PEJECT.BAT—by typing COPY CON PEJECT.BAT at the DOS prompt and pressing Enter. At the blank line, type COPY d:\path\EJECT LPT1 (assuming your printer is connected to LPT1) and press Enter. Then type Ctrl-Z and press

Enter again to create the file. If you want the file to work from any directory in your system, save the batch file in a directory on your DOS PATH and be sure to specify the correct drive letter and complete path for the EJECT file in PEJECT.BAT.

EJECT will work with any PCL-compatible and most dot matrix-compatible printers. If you have a PostScript printer, however, you'll need a different command in the EJECT file. Instead of using Ctrl-L, type SHOWPAGE and press Enter before you type Ctrl-Z and press Enter to save the file.

You can create an icon for PEJECT.BAT in Windows and make it easy to eject a partial page from just about any printer, even if it does have a form-feed button.—Alfred Poor

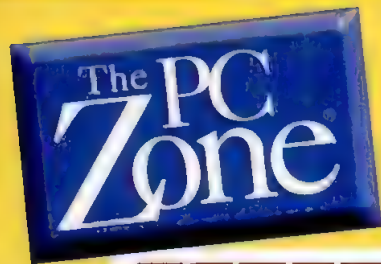
OPERATING ENVIRONMENTS

Sequential Numbers in A Batch File



Is there a way to have a batch file change directories in sequential order, starting with the number 7,000, repeatedly executing the same set of commands in each directory? I have about 600 directories I have to process, and I'd like to be able to do

PC DIRECT Premier Superstores Top Direct Marketers Manufacturers of Systems, Software, and Peripherals If it's sold direct, you'll find it here.		INDEX <table border="1"> <thead> <tr> <th>SYSTEMS</th><th>COMPUTER/DISCOUNT</th></tr> </thead> <tbody> <tr> <td>Bull Expresss325</td><td>WAREHOUSE332</td></tr> <tr> <td>CompuLink Research326</td><td>First Source International318</td></tr> <tr> <td>CompUSA Direct348</td><td>H. Co Memory Upgrades313</td></tr> <tr> <td>COMPUTER DISCOUNT</td><td>HARTFORD COMPUTER GROUP .323</td></tr> <tr> <td>WAREHOUSE332</td><td>INSIGHT DIRECT, INC.320</td></tr> <tr> <td>FOSA Computers317</td><td>LA Trade340</td></tr> <tr> <td>HARTFORD COMPUTER GROUP .323</td><td>MEGAHAUS327</td></tr> <tr> <td>INSIGHT DIRECT, INC.320</td><td>Micro Solutions329</td></tr> <tr> <td>MIDWEST COMPUTER WORKS ..310</td><td>MIDWEST COMPUTER WORKS ..310</td></tr> <tr> <td>Midwest Micro342</td><td>PC Connection328</td></tr> <tr> <td>NEC Technology338</td><td>PC Zone314</td></tr> <tr> <td>NECX331</td><td>ProDirect308</td></tr> <tr> <td>PCs Compleat344</td><td>SPSS, Inc.309</td></tr> <tr> <td>USA Flex341</td><td>Texas Instruments343</td></tr> <tr> <td>SOFTWARE/PERIPHERALS/ COMPONENTS</td><td></td></tr> <tr> <td>ARLINGTON COMPUTER PRODUCTS306</td><td></td></tr> </tbody> </table>		SYSTEMS	COMPUTER/DISCOUNT	Bull Expresss325	WAREHOUSE332	CompuLink Research326	First Source International318	CompUSA Direct348	H. Co Memory Upgrades313	COMPUTER DISCOUNT	HARTFORD COMPUTER GROUP .323	WAREHOUSE332	INSIGHT DIRECT, INC.320	FOSA Computers317	LA Trade340	HARTFORD COMPUTER GROUP .323	MEGAHAUS327	INSIGHT DIRECT, INC.320	Micro Solutions329	MIDWEST COMPUTER WORKS ..310	MIDWEST COMPUTER WORKS ..310	Midwest Micro342	PC Connection328	NEC Technology338	PC Zone314	NECX331	ProDirect308	PCs Compleat344	SPSS, Inc.309	USA Flex341	Texas Instruments343	SOFTWARE/PERIPHERALS/ COMPONENTS		ARLINGTON COMPUTER PRODUCTS306	
SYSTEMS	COMPUTER/DISCOUNT																																				
Bull Expresss325	WAREHOUSE332																																				
CompuLink Research326	First Source International318																																				
CompUSA Direct348	H. Co Memory Upgrades313																																				
COMPUTER DISCOUNT	HARTFORD COMPUTER GROUP .323																																				
WAREHOUSE332	INSIGHT DIRECT, INC.320																																				
FOSA Computers317	LA Trade340																																				
HARTFORD COMPUTER GROUP .323	MEGAHAUS327																																				
INSIGHT DIRECT, INC.320	Micro Solutions329																																				
MIDWEST COMPUTER WORKS ..310	MIDWEST COMPUTER WORKS ..310																																				
Midwest Micro342	PC Connection328																																				
NEC Technology338	PC Zone314																																				
NECX331	ProDirect308																																				
PCs Compleat344	SPSS, Inc.309																																				
USA Flex341	Texas Instruments343																																				
SOFTWARE/PERIPHERALS/ COMPONENTS																																					
ARLINGTON COMPUTER PRODUCTS306																																					



Call The PC Zone For The Lowest Prices...

Check out our expanded line of Notebooks and Desktops
and call us for all your **SOFTWARE** needs, too!

- Brand names. Discount prices!
- Over 20,000 products
- Great customer service

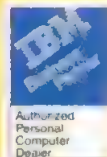
digital™



Hi-Note Ultra II High-performance business partner!

- 133MHz Intel Pentium® processor
- 8MB RAM standard

Processor	Hard Drive	Screen	Order #	Price
P133	1.4GB	10.4" SVGA TFT	#26893	\$4520
Or LEASE monthly for as low as \$119.99/mo.				
Options & Accessories		Order #	Price	
PNV 8MB Upgrade		#28394	\$396.98	



AS LOW AS
\$4999



IBM ThinkPad 760

Pentium® processor-powered portables from IBM!

- Up to 120MHz Intel Pentium® processor
- 8MB RAM standard, upgradable to 40MB
- Up to 12.1" Active Matrix screen
- 28.8 data/fax modem included

Processor	Hard Drive	Screen	Order #	Price
P90	720MB	10.4" TFT	#27902	\$4999
Or LEASE monthly for as low as \$299.99/mo.				
P90	720MB	12.1" SVGA TFT	#27901	\$5499
P120	720MB	12.1" SVGA TFT	#27903	\$5699
P90	1.2GB	12.1" SVGA TFT	#27904	\$6699
*Includes 4X CD-ROM				
Options & Accessories		Order #	Price	
ThinkPad Luvion Battery Pack II		#27904	\$265.00	
8MB Upgrade		#28347	\$369.98	

CD-ROM versions shown

TOSHIBA



Product shown is representative only.

Tecra 720 Series

Packed with power and speed!

- 133MHz Intel Pentium® processor
- 16MB RAM standard
- 6X CD-ROM drive
- Built in 28.8 data/fax modem, full duplex telephony

Processor	Hard Drive	Screen	Order #	Price
P133	1.2GB	12.1" SVGA TFT	#32183	\$7298
Or LEASE monthly for as low as \$179.99/mo.				
Options & Accessories		Order #	Price	
PNV 8MB Upgrade		#28341	\$467.98	
Desktopation 5		#28684	\$749.98	



Satellite 100CS

Pentium® processor-powered notebook for under \$2000!

- 75MHz Intel Pentium® processor
- 8MB RAM
- Brilliant 10.4" color display
- NiMH battery pack and integrated AC adapter
- Select Windows 95 or Windows 3.11 at startup
- One-year warranty and 24-hour technical support

Processor	Hard Drive	Screen	Order #	Price
P75	504MB	10.4" DSCAN	#30717	\$1968
Or LEASE monthly for as low as \$169.99/mo.				
Options & Accessories		Order #	Price	
PNV 8MB Upgrade		#28276	\$379.98	

TEXAS INSTRUMENTS®



Product shown is representative only.

TravelMate 5300

Featuring PCI bus architecture!

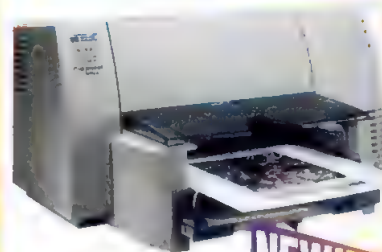
- Intel 133MHz Pentium® processor
- 8MB RAM standard
- Lithium ion battery packs

Processor	Hard Drive	Screen	Order #	Price
P133	1.2GB	11.3" SVGA TFT	#32184	\$5368
Or LEASE monthly for as low as \$129.99/mo.				
Options & Accessories		Order #	Price	
PNV 8MB Upgrade		#33079	\$339.98	



Authorized Reseller

ONLY
\$399⁰⁰
Order #86326



HP DeskJet 820Cse

Professional Series color inkjet printer
Big printing performance for the small office!

- 7 ppm B&W; 3 ppm color
- 50 TrueType fonts included
- 150-sheet paper tray

Order #	Description	Price
#27069	HP DeskJet 820Cse	\$289.98
Order #	Description	Price
#13695	HP High Capacity Black Ink	\$26.98
#27142	DeskJet High Capacity Black Ink - 2 Refills	\$14.98
#27143	DeskJet Black Ink - 2 Refills	\$9.98
#27146	DeskJet Color - 4 Tri-Color Refills	\$22.98

Prices may drop quickly.

All stacked
items shipped
same day.

Credit cards are not charged until the order is shipped. Most products ship the same day for overnight delivery. Packages shipped overnight at \$7 for the first 7 pounds and \$1 for each additional pound or via UPS ground. Call for international shipping rates. Packaging and handling \$4 per order. Returns subject to a restocking fee. Prices and product availability subject to change without notice. Specials and promotions may be limited to stock on hand. Not responsible for typographical errors.
*Dana Commercial Credit Corp. Business Lease: 36 month full-payout lease with a \$1 purchase option based on approved credit. Other leasing options available. Call for full details.

Call Our
Knowledgeable
Sales Advisors!

© 1996 Copyright Multiple Cities International Inc. All rights reserved. Windows is a registered trademark of Microsoft Corp. Unauthorized duplication is a violation of applicable laws. Intel Inside and Pentium® are registered trademarks of the Intel Corporation.

IBM

NOVELL

ACER

ASUS

DELL

HP

IBM

INTEL

LG

MSI

NEC

PACKARD BELL

PHILIPS

SHARP

SONY

TOSHIBA

WANG

YAMAHA

ZENITH

Other

Software

Services

Accessories

Peripherals

Other

Your Computer Discount Catalog SuperStore™

If you don't see what you're looking for - **CALL!**

Visit us Online: CompuServe...GO MZ, Internet...<http://www.internetMCI.com/marketplace/mzone>

Sleepless in Seattle...

You bet! We're here 24 hours a day, 7 days a week to serve you when you need us.



Monitor sold separately

AS LOW AS \$2013

IBM PC 300 Series

High performance and upgradability for your growing business!

- Up to 166MHz Intel Pentium® processor
- 16MB RAM standard
- Accelerated Local Bus video
- ISA/PCI Expansion Bus

Model	CPU	Hard Drive	Order #	Price
Desktop 350	P100	850MB	#27917	\$2013
Or LEASE monthly for as low as \$811*				
Desktop 350	P100	850MB	#27916*	\$2185
Desktop 350	P133	1.2GB	#27945	\$2499
Desktop 350	P166	1.2GB	#30694	\$3018
Desktop 350	P166	1.2GB	#30696*	\$3189

*Includes 4X CD-ROM Drive



ONLY \$479⁹⁸
Order #26201

Hewlett-Packard LaserJet 5L

An excellent laser printer for small offices

- 600x600 dpi with Resolution Enhancement Technology
- 4 ppm print speed

Order #	Description	Price
#23786	LaserJet 5MP Laser Printer	\$1049.00



NEW!
AS LOW AS \$2669

CTX EzBook Series

Performance, quality and value combined!

- Up to 90MHz Pentium® processor
- 8MB RAM standard
- Includes Windows 95 preloaded

Processor	Hard Drive	Screen	Order #	Price
P75	540MB	10.4" TFT	#32121*	\$2669
Or LEASE monthly for as low as \$811*				
P75	810MB	10.4" TFT	#32122*	\$2999
P90	540MB	10.4" TFT	#32123*	\$2789
P90	810MB	10.4" TFT	#32124*	\$2889
P90	810MB	10.4" TFT	#32125*	\$3199

*Includes 2X CD-ROM • 16MB RAM

Options & Accessories	Order #	Price
EzBook/Mini Battery Pack	#32131	\$99.98
EzBook External Battery Charger	#32132	\$49.98



POWER UP WITH PNY MEMORY

Why PNY?

- Compatibility - The largest variety of laptop memory with **GUARANTEED COMPATIBILITY!**
 - Toll-free tech support and fax back service 800-234-4597*
 - Lifetime warranty on all products
 - ISO9001 Quality registered and network approved
- Is your system running slow? Does it take hours to open applications? You don't need a new computer, you just need more memory... the easiest way to open Windows 95!

* Visit our home page at <http://www.pny.com>!

Compaq Concerto 4/25, 4/33

#28212	4MB	\$199.98
#28213	8MB	\$359.98
#28214	16MB	\$519.98

IBM ThinkPad 701c, 80 "Butterfly"

#23166	4MB	\$199.98
#23167	8MB	\$319.98
#23168	16MB	\$532.98

NEC Versa 2000B

#28318	4MB	\$167.98
#28319	8MB	\$349.98
#28320	16MB	\$627.98

Toshiba Tecra 700 Series

#28341	8MB	\$460.98
#28342	16MB	\$907.98

Digital Vireo

#28391	8MB K1	\$320.98
#28392	16MB K1	\$559.98

*Call first and inquire! PNY has a comprehensive line of memory and other add-in products, information and personalized assistance.



ONLY \$459⁹⁸
Order #29929

MAG Innovision DX15T 15" Trinitron Color Monitor
Super fine pitch and resolution!

- 26 mm stripe pitch Trinitron®
- 1280x1024 resolution
- 14" viewable area
- Plug and play technology supports Windows 95

ONLY \$769⁹⁸
Order #29930

MAG Innovision DX17T 17" Trinitron
Super fine pitch & size for your graphics projects!

- 26mm stripe pitch Trinitron®
- 1280x1024 resolution
- 16.1" viewable area
- Plug and play technology supports Windows 95



AS LOW AS \$5499

Canon NoteJet IIICX

Pentium® processor power, plus built-in color printing!

- Up to 120MHz Intel Pentium® processor
- 8MB RAM standard
- Built-in color BubbleJet printer and scanner
- Large 11.8" Active Matrix color screen

Processor	Hard Drive	Screen	Order #	Price
P90	810MB	11.8" Active	#31810	\$5499
Or LEASE monthly for as low as \$811*				
P120	1.2GB	11.8" Active	#31811	\$6599

Lotus.
The PC Zone
1-800-258-8088

TOSHIBA

AST COMPUTER



TEXAS INSTRUMENTS

Visit us Online: CompuServe...GO MZ, Internet...<http://www.internetMCI.com/marketplace/mzone>



1-800-258-8088

Corporate, Education and Government bids welcome! Fax to 1-800-417-1993

CIRCLE 199 ON READER SERVICE CARD

YOUR SOURCE CODE
PMA606

Call for your **FREE Catalog**




```

@ECHO OFF
:: -- Set starting value
:: -- M=thousands, H=hundreds,
T=tens, O=ones
:: -- This example starts at 7000
SET M=7
SET H=0
SET T=0
SET O=0
:Loop
:ReturnM
ECHO Directory is %M%%H%%T%%O% (put
ECHO commands here)
:: -- Replace '7000' in next line
with ending value
IF '%M%%H%%T%%O%'=='7000' GOTO
OutOfLoop
SET Place=O
GOTO Inc
:ReturnO
IF NOT '%O%'=='0' GOTO Loop
SET Place=T
GOTO Inc
:ReturnT
IF NOT '%T%'=='0' GOTO Loop
SET Place=H

```

FIGURE 1: This batch file "counts" the numbers from 7,000 to 7,600.

it without having to run the same batch file 600 times.

MICHAEL SHANNON, via ZD Net

PC MAGAZINE: Batch files have no built-in math abilities, so the basic problem here is getting a batch file to count. The solution is to break down the problem into simple rules that can be expressed in a batch file. For example, a batch file can't calculate the digit that follows a given digit, but a series of ten IF tests can process each possible digit individually. NUMDIRS.BAT (Figure 1) uses this technique and leverages it into a method for adding 1 to a multidigit number.

The batch file starts by defining environment variables O, T, H, and M to hold the ones, tens, hundreds, and thousands digits. In this case, we want to start with the number 7,000, so the batch file sets the thousands digit to 7 and the other three to 0. Now a loop begins that will repeat many, many times. The example batch file simply displays the current number. In practical use it would include instructions to be performed within a directory whose name corresponds to that number.

After processing the directory corresponding to the number stored in the four single-digit environment variables, the batch file must add 1 to the number. First, it sets the environment variable Place to O, the name of the variable holding the ones digit. It jumps to the label Inc, which holds code to increment a digit. The initial value is set to the digit contained in the variable named by the Place variable. Then one of the ten IF tests mentioned

```

GOTO Inc
:ReturnH
IF NOT '%H%'=='0' GOTO Loop
SET Place=M
GOTO Inc

:Inc
IF '%Place%'=='O' SET Value=%O%
IF '%Place%'=='T' SET Value=%T%
IF '%Place%'=='H' SET Value=%H%
IF '%Place%'=='M' SET Value=%M%
IF '%Value%'=='0' SET %Place%=1
IF '%Value%'=='1' SET %Place%=2
IF '%Value%'=='2' SET %Place%=3
IF '%Value%'=='3' SET %Place%=4
IF '%Value%'=='4' SET %Place%=5
IF '%Value%'=='5' SET %Place%=6
IF '%Value%'=='6' SET %Place%=7
IF '%Value%'=='7' SET %Place%=8
IF '%Value%'=='8' SET %Place%=9
IF '%Value%'=='9' SET %Place%=0
GOTO Return%Place%

:OutOfLoop
FOR %%v IN (O T H M Place Value) DO
SET %%v=

```

earlier sets that digit to the next greater digit. Finally a GOTO command jumps to the label "Return%Place%". When the batch file runs, the string %Place% is replaced by the value of the Place variable, so this first time the GOTO jumps to the label ReturnO.

At the ReturnO label, the batch file checks whether the ones digit is zero. If not, control goes back to the top of the loop and another directory gets processed. But if the ones digit is zero, the batch file needs to increment the tens digit. The process for incrementing the tens digit is precisely the same, except that the Place variable is set to T, the name of the variable holding the tens digit. When the string formed by joining the four digits equals 7,600 (the reader's specified stopping point), an IF test near the beginning of the batch file jumps out of the loop. You can use variations on this technique to devise counting batch files of your own.—Neil J. Rubenking

WORD PROCESSING

Inserting Logos and Letterheads in WordPerfect Files



In the Solutions column of October 24, 1995, you described how to use master documents or merges to reduce the size of WordPerfect files containing graphics. Your suggestions are useful, but there is an-



other solution worth mentioning: the Graphic on Disk option. This lets the user see and edit the document exactly as it will print. The graphic is not saved with the document when you save, but the reference to the graphic's location on disk is.

FRANK BILLINGTON, via CompuServe

PC MAGAZINE: The original question posed in the October 24 issue was how to add both the logo and letterhead to a letter without having to save duplicate copies with each letter. As I said in my original response, there are at least two ways to do this: with master documents and merges. Enough readers wrote in suggesting the Graphic on Disk option that it warrants a look.

The Graphic on Disk option, which retrieves the graphic from a file on disk without storing it in the document, is available in both WordPerfect for Windows and WordPerfect for DOS back to at least Version 5.1. The steps for using it, however, vary slightly from one version of WordPerfect to another. Some versions refer to the option as Graphic on Disk and others call it Image on Disk. To keep this discussion simple, I'll describe only the details for WordPerfect for Windows 6.1.

To insert a graphic stored in a different file, simply choose Graphics Image to open the Insert Image dialog box, make sure there's an X in the Image on Disk check box, then select the file and choose OK. WordPerfect will insert the image in your document and let you move and manipulate it just as if the file were stored in the document itself.

I ignored this approach in my original response, because it will only let you insert a graphic. You can insert a logo in each letter without having to save it, but you still have to re-create and resave the text of the letterhead in each letter. Another strike against this option is that it doesn't save as much disk space as the other options.

In the October issue I ran some tests with a logo-plus-letterhead file of 15.7K. Inserting the file in a master document with one line of text using the merge command yielded a file just over 1K. Inserting the file using a master document and condensing it gave me a file of 2.5K. Creating the same letter using the Image on Disk option but re-creating the letterhead text gave me a 3.5K file. So both the merging and master document methods save more disk space than the Image on Disk option.

Note too that while Mr. Billington is correct that the Image on Disk option will let you see and edit the document exactly as it will print, you get the same advantage from master documents. The one clear advantage of the Image on Disk option is that it's somewhat easier to use than either of the other two choices. That is, if you don't count the extra work of re-creating the letterhead in each letter.—M. David Stone

FOSA

the leading notebook technology

Here comes the perfect machine of your dream....

Intel Pentium®
from 75 to 150 MHz CPU
256 KB Secondary Cache
16 bit Stereo Sound Card
PCI bus Graphic Accelerator
with 2 MB Video RAM

Wireless IR Interface

Joy Stick

Touch Pad

4X CD-ROM Drive

Removable Enhanced IDE HDD

Removable FDD for MPEG + Video Module

NEW!
12.1" Active Matrix LCD

11.3" 800 x 600 Dual Scan LCD

Stereo Speakers & Microphone

Removable Battery

Optional:

Mini Docking Station,
58W Secondary Battery,
Video+MPEG, CCD Camera,
TV Tuner modules.

Expansion of PCMCIA type III Slot

NEW! AP-8100
A version of AP-8300
w/o built-in CD-ROM

10.4" Dual Scan LCD

Intel Pentium®
from 75 to 120 MHz CPU
16 bit Stereo Sound Card
PCI bus Video / 1 MB V. RAM
32 bit Local Bus IDE

Type III & Type II PCMCIA Slots

4X CD-ROM Drive

Touch Pad

Stereo Speakers & Microphone

Wireless IR Interface

Removable Battery

Optional:

Numeric Keypad
Mini Docking Station,
MPEG 1 module,
Car Adapter

Optional 3-Year Extended Warranty
from General Electric



We carry other notebook models with customization for your needs. Call for details.

Lifetime Toll-Free Technical Support. One year Parts
and Labor Warranty. 30-Day Money Back Guarantee



Note: 30-Day Money Back Guarantee does not apply to special orders, dealer prices, shipping charges, and return freight.
All returns must have RMA numbers issued by FOSA service Dept. No returns after 30 days. FOSA reserves the right to
charge restocking fee if the returned merchandise is not in new condition with all manuals, boxes, and received materials.

FOSA Computer Inc. All right reserved. All company and/or product names mentioned herein
are trademarks and/or registered trademarks of their respective companies. Price and
specification are subject to change without notice. Not responsible for typographic errors.

CIRCLE 089 ON READER SERVICE CARD

FOSA
Computer Inc.

1-800-216-3672

TEL: 908-753-6100 FAX: 908-753-6616

400 Corporate Court, #D, South Plainfield, NJ 07080

Hours: Mon-Fri. 9AM-6PM; Sat. 10AM-3PM

OUR LOWEST MEMORY PRICES EVER!

Always your **BEST BUY** on the widest selection of memory upgrades!

DESKTOP COMPUTER MEMORY

- ▼ 100% GUARANTEED
- ▼ LIFETIME WARRANTY
- ▼ EASY TO INSTALL
- ▼ FREE TECHNICAL SUPPORT

DELL

256MB SDRAM	\$79
512MB SDRAM	\$129
1GB SDRAM	\$229
2GB SDRAM	\$429

IBM

256MB SDRAM	\$79
512MB SDRAM	\$129
1GB SDRAM	\$229
2GB SDRAM	\$429

PS/2 286 30 286	\$79
PS/2 386 40 386	\$129
PS/2 486 40 486	\$179
PS/2 586 40 586	\$229

Paragon
Memory Corporation

Kingston
TECHNOLOGY CORPORATION

AST

256MB SDRAM	\$79
512MB SDRAM	\$129
1GB SDRAM	\$229
2GB SDRAM	\$429

GATEWAY 2000

256MB SDRAM	\$79
512MB SDRAM	\$129
1GB SDRAM	\$229
2GB SDRAM	\$429

HEWLETT-PACKARD

256MB SDRAM	\$79
512MB SDRAM	\$129
1GB SDRAM	\$229
2GB SDRAM	\$429

COMPAQ

256MB SDRAM	\$79
512MB SDRAM	\$129
1GB SDRAM	\$229
2GB SDRAM	\$429

STANDARD SIMMS

30-PIN	72-PIN Non-parity	72-PIN Parity
1 x 3-70ns (3-chip/1MB) \$17	1 x 32-70 (4MB) \$68	1 x 36-70 (4MB) \$77
1 x 9-70ns (1MB) \$27	2 x 32-70 (8MB) \$119	2 x 36-70 (8MB) \$153
4 x 3-70ns (3-chip/4MB) \$77	4 x 32-70 (16MB) \$261	4 x 36-70 (16MB) \$294
4 x 9-70ns (4MB) \$88	8 x 32-70 (32MB) \$594	8 x 36-70 (32MB) \$619

ALWAYS CALL FSI BEFORE YOU BUY!

NEC

256MB SDRAM	\$79
512MB SDRAM	\$129
1GB SDRAM	\$229
2GB SDRAM	\$429

PACKARD BELL

256MB SDRAM	\$79
512MB SDRAM	\$129
1GB SDRAM	\$229
2GB SDRAM	\$429

CACHE MEMORY

Your 486 or Pentium computer should have at least 256K cache memory for optimal performance!

STANDARD CACHE CHIPS

8K x 8 1.5ns DIP	\$2.25
8K x 8 20ns DIP	\$2.25
32K x 8 1.5ns DIP	\$4.00
32K x 8 20ns DIP	\$4.00
32K x 9 1.5ns DIP	\$4.00
32K x 9 20ns DIP	\$4.00
64K x 4 1.5ns DIP	\$4.00
64K x 4 20ns DIP	\$4.00

Intel Pentium Motherboards

256K Pipeline Burst Cache Module	\$49
Compaq 256K Cache Module	\$49
IBM 256K Cache Module	\$69
AST 256K Cache Kit	\$59

CALL FOR VIDEO RAM UPGRADES

LAPTOP & NOTEBOOK MEMORY

Call for Apple notebook memory

Compaq 486 4 33	\$129
Compaq 486 4 33	\$129
Compaq 486 4 33	\$129
Compaq 486 4 33	\$129

DELL

256MB SDRAM	\$79
512MB SDRAM	\$129

IBM

256MB SDRAM	\$79
512MB SDRAM	\$129

NEC

256MB SDRAM	\$79
512MB SDRAM	\$129

PACKARD BELL

256MB SDRAM	\$79
512MB SDRAM	\$129

WHY ADD MORE MEMORY?

Microsoft

"We recommend 16MB of RAM for Windows 3.1 or Windows 95, particularly if you plan to run multiple applications."

DIGITAL

256MB SDRAM	\$79
512MB SDRAM	\$129
1GB SDRAM	\$229
2GB SDRAM	\$429

TEXAS INSTRUMENTS

256MB SDRAM	\$79
512MB SDRAM	\$129
1GB SDRAM	\$229
2GB SDRAM	\$429

TOSHIBA

256MB SDRAM	\$79
512MB SDRAM	\$129
1GB SDRAM	\$229
2GB SDRAM	\$429

AST

256MB SDRAM	\$79
512MB SDRAM	\$129
1GB SDRAM	\$229
2GB SDRAM	\$429

NEC

256MB SDRAM	\$79
512MB SDRAM	\$129
1GB SDRAM	\$229
2GB SDRAM	\$429

PACKARD BELL

256MB SDRAM	\$79
512MB SDRAM	\$129

LASER PRINTER MEMORY

256MB SDRAM	\$79
512MB SDRAM	\$129
1GB SDRAM	\$229
2GB SDRAM	\$429

NEC

256MB SDRAM	\$79
512MB SDRAM	\$129
1GB SDRAM	\$229
2GB SDRAM	\$429

PACKARD BELL

256MB SDRAM	\$79
512MB SDRAM	\$129
1GB SDRAM	\$229
2GB SDRAM	\$429

IF YOU CAN'T FIND WHAT YOU'RE LOOKING FOR CALL!

My stock memory upgrades for thousands of computers & printers

Call the Upgrade Experts
ORDER NOW
800-218-9866
International Orders Call 714-448-7750

\$8 FedEx Economy Two-Day Service



TERMS & CONDITIONS: Cash and orders shipped only to your verified billing address. Unshipped orders may be returned within 15 days of order date for a full refund including shipping and insurance. All other returns must be in new, resalable condition. In-store or in-person only. Inventory not available at all locations. Due to the high demand for our products, we may not have all items in stock. We reserve the right to change prices without notice. Products are sold as-is. No warranty is given. We are not responsible for errors in our publications or shipping delays. Products and equipment are sold as-is. ©1998 First Source International, Inc.

OVER 36,000 HARDWARE & SOFTWARE PRODUCTS AT DISCOUNT PRICES!

- DISCOUNT PRICES
- HUGE SELECTION
- OVERNIGHT DELIVERY
- FREE SUPPORT FOR FSI CUSTOMERS
- SATISFACTION GUARANTEED

- NO SURCHARGE ON CREDIT CARDS
- CORPORATE PO'S WELCOME
- GOVERNMENT & EDUCATIONAL PRICING

SEE US ON THE INTERNET
www.firstsource.com

CALL FOR ANY MEMORY UPGRADE NOT LISTED
We stock memory upgrades for thousands of computers & printers



LAPTOP & NOTEBOOK MEMORY

CALL FOR APPLE NOTEBOOK MEMORY

COMPAQ

Model	RAM	Part No.	Price
Contura Aero	4MB	190532-001	\$125
	8MB	190597-001	\$225
	16MB	190598-001	\$459
Contura 4/25, 4/33	4MB	144790-001	\$125
	8MB	144790-002	\$225
	16MB	144790-003	\$459
UTE Elite 4/40, 4/50, 4/75	4MB	199013-001	\$125
	8MB	199015-001	\$225
	16MB	199017-001	\$459
Contura 400, 410, 420, 430	4MB	147653-001	\$125
	8MB	147655-001	\$225
	16MB	147657-001	\$459
Elite 5000	8MB	213515-001	\$225
	16MB	213515-002	\$459
	32MB	213515-003	\$999
	64MB	213515-004	\$2,089

AST

Model	RAM	Part No.	Price
Ascentia 900N, 910N	4MB	501488-001	\$125
	8MB	501488-002	\$225
	16MB	501488-003	\$459
Ascentia 900N, 910N	4MB	501392-001	\$125
	8MB	501392-002	\$225
	16MB	501392-003	\$459
Ascentia 950N	8MB	501728-002	\$225
	16MB	501728-003	\$459
Ascentia J, P	n/a	n/a	Call

DELL

Model	RAM	Part No.	Price
Latitude XP, P75, P90	8MB	310-3435	\$259
	16MB	310-3436	\$579

IBM

Model	RAM	Part No.	Price
ThinkPad 360	4MB	84G5689	\$125
	8MB	84G5692	\$225
	16MB	84G5995	\$459
ThinkPad 365, 365CD	4MB	92G7287	\$151
	16MB	92G7293	\$599
ThinkPad 701	4MB	04H6193	\$125
	8MB	04H6194	\$225
	16MB	04H6195	\$459
ThinkPad 700, 720	4MB	07G1419	\$125
	8MB	07G1420	\$225
	16MB	07G1421	\$579
ThinkPad 760, 760CD	8MB	92G7316	\$322
	16MB	92G7316	\$599

DIGITAL

Model	RAM	Part No.	Price
HiNote	4MB	FR-PC7MAA	\$141
	8MB	FR-PC7MAA	\$265
	16MB	FR-PC7MAA	\$379
HiNote Ultra	4MB	FR-PC8MAA	\$141
	8MB	FR-PC8MAA	\$265
	16MB	FR-PC8MAA	\$379

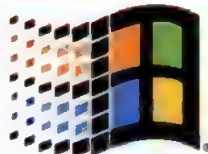
TEXAS INSTRUMENTS

Model	RAM	Part No.	Price
Extensa 450	4MB	9803932-0001	\$151
	8MB	9803950-0001	\$309
	16MB	9803933-0001	\$599
	8MB	9809810-0001	\$285
	16MB	9809811-0001	\$599
	32MB	9809811-0001	\$1,139
	8MB	9798816-0002	\$303
	16MB	9798816-0002	\$719
	8MB	9793357	\$171
	16MB	9793358	\$739

TOSHIBA

Model	RAM	Part No.	Price
T2100, T2105	4MB	NW2026U	\$125
	8MB	NW2027U	\$225
	16MB	NW2028U	\$425
	24MB	NW2029U	\$859
T2150, T2155	4MB	PC-PA2012U	\$140
	8MB	PC-PA2013U	\$269
	16MB	PC-PA2014U	\$599
	32MB	PC-PA2015U	\$1,139
	4MB	PC-PA2019U	\$141
	8MB	PC-PA2020U	\$269
	16MB	PC-PA2023U	\$549
	8MB	NW2031U	\$279
	16MB	NW2032U	\$459
	32MB	NW2034U	\$829
T400, T405, T410, T415	8MB	NW2035U	\$409
T610, T615, T620, T625	8MB	NW2036U	\$409
	16MB	NW2037U	\$799

WHY ADD MORE MEMORY?



Microsoft®

"We recommend 16MB of RAM (for Windows 3.1 or Windows 95), particularly if you plan to run multiple applications."

— PC Magazine, May 16, 1995

MEGAHERTZ

28.8bps PCMCIA Fax/Modem with XJACK®



MEGAHERTZ newest PCMCIA Fax Modem with XJACK® features the V.34 standard for high speed access. 28,800bps—the fastest standard speed available!

FREE NETCOM NetCruiser® Internet Software!

XJACK® 28.8 Fax/Modem V.34 MNP3	\$282
Combo Fax/Modem Ethernet 14.4, 10Base-T	\$289
XJACK® 14.4 Fax/Modem	\$79

JUNO

You need e-mail. But you don't need to pay for it.



To get Juno, call 1-800-398-JUNO, ext. C. Or e-mail us: firstsource@offer.juno.com

Free Internet E-mail Service

NOGATECH

Capture & Display Live Video From Your Ext. Video Source On Your Color Computer

- Full Motion Video Capture at up to 30 frames per second at 320 x 240 resolution
- Simultaneous audio and video recording
- Captures still images in 640 x 480 high-res. 24-bit color
- NTSC and PAL with Composite video. S-video option
- Includes live motion video in seconds with your favorite multimedia presentation software
- Windows 95 & Windows 3.11 video software included

CaptureVision PCMCIA Card	\$389
Notebook TV PCMCIA	\$429
TV Tuner Upgrade (for CaptureVision)	\$139

TARGUS

NOTEBOOK CARRYING CASES



AITECH

VGA to TV Converters



Pocket Scan Converter	\$99
Multi Pro CTV	\$259
Road Warrior Presenter	\$379

POINTING DEVICES

CIRQUE GlidePoint Portable TrackPad, PS/2 cone	\$39
--	------

MICROSOFT Ergonomic Mouse MIND PATH Remote Control for Presentations wireless mouse \$124

CD-ROM DRIVES

MICRO SOLUTIONS BackPack 4X CD-ROM heads to printer port	\$249
BackPack 4X CD-ROM w/stand heads to printer port	\$349
BackPack 6X CD-ROM heads to printer port	\$339
BackPack 6X CD-ROM w/stand heads to printer port	\$429
PANASONIC KXL-D720 2X CD-ROM w/PCMCIA card	\$298
KXL-D721 2X CD-ROM w/PCMCIA/Serial	\$549
KXL-D740 4X CD-ROM w/PCMCIA card	\$392
KXL-D745 4X CD-ROM w/PCMCIA/Serial	\$436

PC CARDS (PCMCIA)

ADAPTEC APA 1460 SCSI Kit	\$179
EPSON 28.8 XJACK PCMCIA Fax/Modem	\$259
Ethernet 10Base-T	\$103
Ethernet 10Base-T and BNC	\$129
170MB PC Card Hard Drive	\$360
260MB PC Card Hard Drive	\$404
340MB PC Card Hard Drive	\$459
SRAM 5MB - 2MB/FLASH 2 5MB - 40MB	Call
MEGAHERTZ 14.4 Fax/Modem w/XJACK	\$79
28.8 Fax/Modem w/XJACK	\$282
Ethernet XJACK 10Base-T	\$122
Ethernet XJACK Combo	\$158
Ethernet + 14.4 Modem XJACK 10Base-T	\$259
Ethernet + 14.4 Modem XJACK Combo	\$270

NEW MEDIA WAVJammer 16-bit Sound Card	\$219
BusMaster SCSI Card	\$192
Multimedia Combo+SCSI+Sound Card	\$399
SOCKET Serial I/O Card, DB-9 Connector	\$149
PageCard Wireless Messaging	\$329
Mobile Global Positioning System Card	\$723
XIRCOM CreditCard IPS Ethernet 10Base-T	\$138
CreditCard IPS Ethernet Combo	\$185
CreditCard Ethernet + 14.4 Modem, 10Base-T	\$352
CreditCard Ethernet + 14.4 Modem, Combo	\$470
CreditCard Ethernet + 28.8 Modem, 10Base-T	\$356
CreditCard Ethernet + 28.8 Modem, Combo	\$324
CreditCard Ethernet Network Wireless	\$309

STORAGE

CONNER TapeStar 800MB Tape B-up, heads to printer port	\$230
IOMEGA Zip 100MB Remov. Drive, heads to printer port	\$199
Dillo Easy 800MB Tape B-up, heads to printer port	\$149
MICRO SOLUTIONS BackPack 850MB HDD, heads to printer port	\$389
BackPack 1 2GB HDD, heads to printer port	\$440
BackPack 1 6GB HDD, heads to printer port	\$499
BackPack 800MB tape backup, heads to printer port (Grey or Black)	\$159

PRINTERS

CANON BJC 70 3ppm, 720, 360dpi, color	\$350
BJC 610 3ppm, 720x720dpi, color	\$434
BJC 4100 4ppm, 720x360dpi, color	\$321
HEWLETT-PACKARD DeskJet 340, 3ppm, 600x300dpi, color	\$296
LaserJet 5L 4ppm, 600dpi, 1MB	\$504
COSTAR LabelWriter XL w/AddressMate software	\$149
LabelWriter XL Plus w/AddressMate soft.	\$243

IF YOU DON'T SEE WHAT YOU'RE LOOKING FOR - CALL!

\$8 FedEx Economy Two-Day Service
FedEx Federal Express

Call the Notebook Experts
ORDER NOW
800-709-9866
International Orders Call 714-448-7750

CALL NOW FOR YOUR FREE CATALOG!
CIRCLE 014 ON READER SERVICE CARD

#1 Direct Reseller of Hard Drives 8 Years Running!

Get the most from your hard drive—get the

right controller! Insight carries a vast selection—just call!

Capacity**	Model	Access	Cache	RPM	MaxTransf. Rate	Form/HL	Interface	Mfr.'s Wty.	Prod. Code	Price
WESTERN DIGITAL										
850MB	Caviar	10ms	64	4,500	16.6Mbytes	3.5" 1"H	Enhanced IDE	3 Year	WD2850A	\$195.99
1080MB	Caviar	10ms	128	5,200	16.6Mbytes	3.5" 1"H	Enhanced IDE	3 Year	WD21000A	205.99
1280MB	Caviar	10ms	128	5,200	16.6Mbytes	3.5" 1"H	Enhanced IDE	3 Year	WD21000A	209.99
1620MB	Caviar	10ms	128	5,200	16.6Mbytes	3.5" 1"H	Enhanced IDE	3 Year	WD31600A	249.99
2113MB	Caviar	12ms	128	5,200	16.6Mbytes	3.5" 1"H	Enhanced IDE	3 Year	WD32100A	319.99
2550MB	Caviar	12ms	128	5,200	16.6Mbytes	3.5" 1"H	Enhanced IDE	3 Year	WD32500A	379.99
Seagate										
810MB	Marathon	16ms	120	4,500	16.6Mbytes	2.5" 19.15MM	Fast ATA-2	3 Year	ST9816AG	\$399.99
541MB	Cabo 541	14ms	64	3,600	16.6Mbytes	3.5" 1"H	Fast ATA-2	3 Year	ST3541A	179.99
631MB	Medalist KE	14ms	120	3,811	16.6Mbytes	3.5" 1"H	Fast ATA-2	3 Year	ST3630A	179.99
1082MB	Cabo 1080	14ms	64	3,600	16.6Mbytes	3.5" 1"H	Fast ATA-2	3 Year	ST31081A	CALL
1275MB	Cabo 1276	12.5ms	64	4,500	16.6Mbytes	3.5" 1"H	Fast ATA-2	3 Year	ST31276A	229.99
1623MB	Cabo 1621	14ms	64	3,600	16.6Mbytes	3.5" 1"H	Fast ATA-2	3 Year	ST31621A	239.99
1282MB	Medalist SL	10.5ms	128	5,400	16.6Mbytes	3.5" 75"H	Fast ATA-2	3 Year	ST51270A	215.99
2113MB	Medalist	10ms	128	5,400	16.6Mbytes	3.5" 1.02"H	Fast ATA-2	3 Year	ST32140A	289.99
4250MB	Medalist	10.5ms	128	5,400	16.6Mbytes	3.5" 1.02"H	Fast ATA-2	3 Year	ST34250A	CALL
TOSHIBA										
810MB	Slimline	13ms	128	4,200	13.3Mbytes	2.5" 12.7MM	Fast ATA	1 Year	MK1926FCV	\$449.99
1300MB	Slimline	13ms	128	4,200	13.3Mbytes	2.5" 12.7MM	Fast ATA	1 Year	MK1301MAV	699.99
1300MB	Notebook	13ms	128	4,200	13.3Mbytes	2.5" 19MM	Fast ATA	1 Year	MK2720FC	599.99
2100MB	Notebook	13ms	128	4,200	13.3Mbytes	2.5" 19MM	Fast ATA	1 Year	MK2101MAN	CALL
FUJITSU										
1090MB	Winchester	12ms	64	4,500	16.6Mbytes	3.5" 1"H	Fast-ATA-2	3 Year	FJ1614A	\$205.99
Quantum										
850MB	Traillblazer	14ms	128	4,500	16.6Mbytes	3.5" 1"H	Fast-ATA-2	3 Year	QUTR850A	\$199.99
1286MB	Bigfoot	15.5ms	128	3,600	16.6Mbytes	5.25" 75"H	Fast-ATA-2	3 Year	QUBF1286A	219.99
1280MB	Fireball	12ms	128	5,400	16.6Mbytes	3.5" 1"H	Fast-ATA-2	3 Year	QUBF1280A	225.99
1708MB	Sirroc	11ms	128	4,500	16.6Mbytes	3.5" 1"H	Fast-ATA-2	3 Year	QUSR1708A	299.99
2577MB	Bigfoot	15.5ms	128	3,600	16.6Mbytes	5.25" 75"H	Fast-ATA-2	3 Year	QUBF2577A	389.99
2550MB	Sirroc	11ms	128	5,400	16.6Mbytes	3.5" 1"H	Fast-ATA-2	3 Year	QUSF2550A	399.99
Maxtor										
1084MB	Durango	11ms	64	4,500	16.6Mbytes	3.5" 1"H	Enhanced IDE	3 Year	MX71084A	\$199.99
1336MB	Durango	11ms	64	4,500	16.6Mbytes	3.5" 1"H	Enhanced IDE	3 Year	MX71336A	229.99
1670MB	Durango	11ms	64	4,500	16.6Mbytes	3.5" 1"H	Enhanced IDE	3 Year	MX71626A	239.99
2094MB	Durango	11ms	64	4,500	16.6Mbytes	3.5" 1"H	Enhanced IDE	3 Year	MX72094A	299.99
IDE Controllers										
1080MB	Deskstar	10.5ms	512	5,400	16.6Mbytes	3.5" 1"H	Fast-ATA-2	3 Year	IB94G3186	\$269.99
1700MB	Deskstar	12ms	128	4,500	16.6Mbytes	3.5" 1"H	Fast-ATA-2	3 Year	IB96H8724	329.99

**Based upon mfr's quoted capacity where 1MB=1,048,576 bytes. Seagate and the Seagate Logo are Registered Trademarks of Seagate Technology, Inc.

IDE Controllers

Promise 16bit ISA, Enhanced IDE controller w/BIOS
 PREDEMAX \$39.99
 • PIO Mode 3, 13.3Mb/Sec. Max. sustained transfer rate

Promise 16bit ISA, Enhanced IDE controller w/BIOS
 PREDEPRO \$59.99
 • PIO Mode 3, 13.3Mb/Sec. Max. Sustained transfer rate
 • 2 Serial ports, 1 Parallel port, 1 Game port
 • High speed tape and floppy support

Promise 32bit VL-bus, Enhanced IDE controller w/BIOS
 PRO32B3 \$55.99
 • PIO Mode 4, 16.6Mb/Sec. Max. Sustained transfer rate
 • 2 Serial ports, 1 Parallel port

DTC 32bit PCI, Enhanced IDE controller
 DTC2180 \$39.99
 • PIO Mode 4, 16.6Mb/Sec. Max. Sustained transfer rate



Seagate
Medallist IDE
2113MB

\$289.99

Seagate
 Gigabyte
 Choice

SCSI Controllers

QLQlogic 16bit ISA, Fast SCSI-2 controller
 QLS15A0EM \$119.99
 • 10Mb/Sec. Max. Sustained transfer rate
 • Floppy support and Corel SCSI software
 • 50 pin SCSI-2 external connector

QLQlogic 16bit PCI, Fast SCSI-2 controller
 QLS15P0EM \$129.99
 • 10Mb/Sec. Max. Sustained transfer rate
 • Corel SCSI software
 • 50 pin SCSI-2 external connector

Western Digital 16bit PCI, WideFast SCSI-3 controller
 WD1678WS \$159.99
 • 20Mb/Sec. Max. Sustained transfer rate
 • Floppy support and Corel SCSI software

Adaptec 32bit PCI, Fast Wide Ultra SCSI-3 controller
 AD2940UW \$329.99
 • 40Mb/Sec. Max. Sustained transfer rate
 • 50 & 68 pin internal connectors
 • 68 pin external connector

Prices and availability are subject to change without notice. All trademarks and trade names are the properties of their respective owners. The Intel Inside Logo, Intel, Pentium, Celeron, and i486 are trademarks or registered trademarks of Intel Corporation. Photos may not represent actual product. Typographic errors are subject to correction. All products carry full manufacturer's warranties. If any insight does not guarantee product compatibility. Most unopened product may be returned to Insight for a full credit, excluding shipping charges, within 30 days of purchase. Return of opened product is subject to a 15% restocking fee. Returns of computers, notebooks, scanners, and printers will be charged a 15% restocking fee and must be received by Insight, unopened, within 15 days of purchase. All returns must be in original condition and require an RMA number. Packages without an RMA will not be accepted. Sorry no refunds can be made after 30 days, all sales are final. Shipping is not refundable. Returns address: Insight Returns Dept., RMA4 (your RMA#), 2415 S. Riverwood, Tampa, AZ 83602 1912 W. 4th St., Tampa, AZ 83601 800-998-8043 1000 200777-3000 © Insight Direct, Inc. 6/98



Insight

3 NASDAQ
traded
company

Your Direct Source
800-998-8043
<http://www.insight.com>

Get the most from your hard drive—get the

right controller! Insight carries a vast selection—just call!

Capacity**	Model	Access	Cache	RPM	MaxTransf. Rate	Form/HL	Interface	Mfr.'s Wty.	Prod. Code	Price
Seagate										
1050MB	Hawk 2XL	9ms	512	5,411	20Mbytes	3.5" 1"H	Ultra SCSI	5 Year	ST31055N	\$375.99
2149MB	Hawk 2XL	9ms	512	5,411	20Mbytes	3.5" 1"H	Ultra SCSI	5 Year	ST32155N	629.99
2149MB	Hawk 2XL	9ms	512	5,411	40Mbytes	3.5" 1"H	Ultra Wide SCSI	5 Year	ST32155W	659.99
2150MB	Caymen	8.5ms	512	7,200	10Mbytes	3.5" 1"H	Fast SCSI-2 A/V	5 Year	ST32107N	679.99
4294MB	Hawk 4	9ms	512	5,411	10Mbytes	3.5" HH	Fast SCSI-2 A/V	5 Year	ST15230N	979.99
4294MB	Caymen	9ms	512	7,200	10Mbytes	3.5" HH	Fast SCSI-2 A/V	5 Year	ST14207N	999.99
2147MB	Barracuda 2LP	8ms	512	7,200	10Mbytes	3.5" 1"H	Fast SCSI-2 A/V	5 Year	ST32550N	765.99
2147MB	Barracuda 2LP	8ms	512	7,200	20Mbytes	3.5" 1"H	Fast Wide SCSI-2 A/V	5 Year	ST32550W	819.99
2150MB	Barracuda 4LP	8ms	512	7,200	20Mbytes	3.5" 1"H	Ultra SCSI	5 Year	ST32171N	CALL
2150MB	Barracuda 4LP	8ms	512	7,200	40Mbytes	3.5" 1"H	Ultra Wide SCSI	5 Year	ST32171W	CALL
4294MB	Barracuda 4	8ms	1,024	7,200	10Mbytes	3.5" HH	Fast SCSI-2 A/V	5 Year	ST15150N	1,099.99
4294MB	Barracuda 4	8ms	1,024	7,200	20Mbytes	3.5" HH	Fast Wide SCSI-2 A/V	5 Year	ST15150W	1,129.99
4294MB	Barracuda 4	8ms	1,024	7,200	20Mbytes	3.5" HH	Fast Wide SCSI/SCA	5 Year	ST15150WC	1,149.99
4350MB	Barracuda 4LP	8ms	512	7,200	20Mbytes	3.5" 1"H	Ultra SCSI	5 Year	ST34371N	CALL
4350MB	Barracuda 4LP	8ms	512	7,200	40Mbytes	3.5" 1"H	Ultra Wide SCSI	5 Year	ST34371W	CALL
9090MB	Elite 9	11ms	1,024	5,400	10Mbytes	5.25" FH	Fast SCSI-2 A/V	5 Year	ST410800N	CALL
9090MB	Elite 9	11ms	1,024	5,400	20Mbytes	5.25" FH	Fast Wide SCSI-2 A/V	5 Year	ST410800W	CALL
9100MB	Barracuda 9	8ms	512	7,200	20Mbytes	3.5" HH	Ultra SCSI	5 Year	ST19171N	CALL
9100MB	Barracuda 9	8ms	512	7,200	40Mbytes	3.5" HH	Ultra Wide SCSI	5 Year	ST19171W	CALL
FUJITSU										
2100MB	Allegro	8.9ms	512	7,200	20Mbytes	3.5" HH	Fast Wide SCSI-2 A/V	5 Year	FJ2915W	\$659.99
4200MB	Allegro	8.9ms	512	7,200	10Mbytes	3.5" HH	Fast SCSI-2 A/V	5 Year	FJ2934S	959.99
MICROPOLIS										
2100MB	Taurus	8.5ms	512	7,200	10Mbytes	3.5" 1"H	Fast SCSI-2	5 Year	MC4221S	\$659.99
4300MB	Capricorn	8.5ms	512	7,200	10Mbytes	3.5" HH	Fast SCSI-2	5 Year	MC3243S	1,029.99
9100MB	Scorpio	12ms	512	5,400	10Mbytes	5.25" FH	Fast SCSI-2	5 Year	MC1991	1,999.99
2100MB	Taurus	8.5ms	512	7,200	20Mbytes	3.5" 1"H	Fast Wide SCSI-2 A/V	5 Year	MC4221AVW	899.99
4300MB	Capricorn	8.5ms	512	7,200	20Mbytes	3.5" HH	Fast Wide SCSI-2 A/V	5 Year	MC3243AVW	1,249.99
9100MB	Scorpio	12ms	512	5,400	20Mbytes	5.25" FH	Fast Wide SCSI-2 A/V	5 Year	MC1991AVW	2,229.99
Quantum										
1080MB	Fireball	12ms	128	5,400	10Mbytes	3.5" 1"H	Fast SCSI-2	3 Year	QUBF1080S	\$269.99
1280MB	Fireball	11ms	128	5,400	10Mbytes	3.5" 1"H	Fast SCSI-2	3 Year	QUBF1280S	319.99
2150MB	Atlas	8ms	1,024	7,200	10Mbytes	3.5" 1"H	Fast SCSI-2	5 Year	QUXP3125S	679.99
2150MB	Atlas	8ms	1,024	7,200	20Mbytes	3.5" 1"H	Fast Wide SCSI-2	5 Year	QUXP3125W	729.99
4300MB	Atlas	8ms	1,024	7,200	10Mbytes	3.5" HH	Fast SCSI-2	5 Year	QUXP3430S	999.99
4300MB	Atlas	8ms	1,024	7,200	20Mbytes	3.5" HH	Fast Wide SCSI-2	5 Year	QUXP3430W	1,079.99
IDE Controllers										
2100MB	Ultrastar	7.5ms	512	7,200	10Mbytes	3.5" 1"H	Fast SCSI-2	5 Year	IB94G3054	\$1,049.99
4500MB	Ultrastar/XP	8ms	512	7,200	10Mbytes	3.5" HH	Fast SCSI-2	5 Year	IB94G3196	1,499.99
2100MB	Ultrastar	7.5ms	512	7,200	20Mbytes	3.5" 1"H	Fast Wide SCSI-2	5 Year	IB94G3055	1,049.99
4500MB	Ultrastar/XP	8ms	512	7,200	20Mbytes	3.5" HH	Fast Wide SCSI-2	5 Year	IB94G3057	1,399.99
5310MB	Ultrastar	8ms	512	5,400	20Mbytes	3.5" HH	Fast Wide SCSI-2	5 Year	IB94G3059	1,449.99

**Based upon mfr's quoted capacity where 1MB=1,048,576 bytes. Seagate and the Seagate Logo are Registered Trademarks of Seagate Technology, Inc.

CIRCLE 219 ON READER SERVICE CARD

SPREADSHEETS

YTD Formulas in Multisheet Workbooks



Microsoft Excel's multisheet workbooks seem as if they'd be ideal for calculating year-to-date values, but Excel makes it surprisingly difficult to enter year-to-date formulas. For example, assume you have a workbook with sheets named Jan, Feb, and so on through Dec. Assume also that on each sheet, some cell—say, C4—has a monthly value, and that below that on each sheet you store the YTD value.

On Feb!C5, you enter the formula =Jan!C5+C4. If you copy this formula to cell C5 on each of the remaining sheets, Excel does not treat the reference to the January sheet as a relative reference. Instead of giving you =Feb!C5+C4, =Mar!C5+C4, and so on, it simply makes each copied formula reference the same January cell.

The macro in Figure 2 uses Excel's Replace command to fix this problem. It uses SpecialCells(xlLastCell) to select the entire populated region of each worksheet, and on each sheet it gets the replacement value for Jan from the name of the previous sheet. This assumes, of course, that the sheets are arranged in ascending-month order. The macro is otherwise general, however; it is not necessary that the first month be January or even that there be 12 sheets.

MICHAEL TROMBETTA, Manhasset, NY

PC MAGAZINE: The reason Excel doesn't treat Jan! as a relative reference is that Excel isn't a truly three-dimensional spreadsheet. As of Version 7 (Excel for Windows 95), the pro-

```
Sub CorrectYTDcalc()
    Dim FirstName As String, ReplaceName As String
    Dim N As Integer

    FirstName=Worksheets(1).Name
    FirstName=FirstName & "!"

    For N = 3 to Worksheets.Count
        Worksheets(N).Activate
        ReplaceName=Worksheets(N-1).Name
        ReplaceName=ReplaceName & "!"
        Range("A1", _
Range("A1").SpecialCells(xlLastCell)).Select
        Selection.Replace _
what:=FirstName, replacement:=ReplaceName
    Next N
End Sub
```

FIGURE 2: This Excel macro fixes cumulative references to the previous sheets in a workbook, letting you insert YTD formulas in a workbook of monthly spreadsheets.

gram handles cross-sheet references within a workbook the same way it handles references to cells lying outside the workbook altogether; that is, it treats them as absolute. Mr. Trombetta would not experience the same problem creating YTD formulas in either Lotus 1-2-3 (Release 3 or later) or Quattro Pro.

The macro submitted by Mr. Trombetta is one way to work around Excel's clumsiness. Two others are shown in Figure 3. All of them are available from PC Magazine Online in the file COR-YTD.TXT. See the sidebar "Guide to Our Utilities," in this issue's Utilities column, for downloading instructions.

YTD is a custom function that simply totals the values in a particular cell position on all sheets beginning at the workbook's first sheet and ending at the current sheet. For example, if you call the function with

=YTD(C4)

on your May worksheet, the function returns the sum of Jan!C4, Feb!C4, and so on through the May worksheet.

YTD just returns a number, and without reviewing the code behind the function, you can't tell how the number was derived. The BuildFormula macro, by contrast, constructs a formula like this:

=SUM(Jan:May!\$C\$4)

so you can see where your YTD numbers are coming from. When you run the macro, a dialog box prompts you to type a cell reference or point to a cell. The cell (or range) you name is then plugged into the resulting SUM formula.

Note that this macro is less general than Mr. Trombetta's. It assumes that the sheets you want to tally begin with Jan. If your fiscal year starts in some other month, just substitute the name of that month in the line immediately before End Sub.—Craig Stinson

```
Function YTD(CellRef) As Double
    Dim rw As Integer, cl As Integer, idx As Integer
    rw = CellRef.Row
    cl = CellRef.Column
    For idx = 1 To ActiveSheet.Index
        YTD = YTD + Worksheets(idx).Cells(rw, cl).Value
    Next
End Function

Sub BuildFormula()
    Dim CellRef As Range
    Dim Address As String

    Set CellRef = Application.InputBox(prompt:= _
    "Click on a cell or type the reference", _
    Title:="Which cell do you want in the sum?", _
    Type:=8)
    Address = CellRef.Address
    ActiveCell.Formula = _
    "=SUM(Jan:" & ActiveSheet.Name & "!" & Address & ")"
End Sub
```

FIGURE 3: The YTD custom function and the BuildFormula macro shown here are alternative solutions to cumulative sheet references.

DATABASES

Simulating Spinners in Microsoft Access



Here's how I simulated a spinner control on a form in Microsoft Access. I had a control named Number whose value I wanted to increment and decrement. To the right of that control I placed a command button named RightArrow with a right arrow as its picture. I set RightArrow's AutoRepeat property to Yes and placed the following code in its Click event:

```
Sub RightArrow_Click ()
    Me!Number.SetFocus
    Me!Number = Me!Number + 1
    Me!RightArrow.SetFocus
End Sub
```

I duplicated this logic on the left side by creating a command button called LeftButton to the left of the Number control. I set its AutoRepeat property to Yes and placed this code in its Click event:

```
Sub LeftArrow_Click ()
    Me!Number.SetFocus
    Me!Number = Me!Number - 1
    If Me!Number < 0 Then
        DoCmd Beep
        Me!Number = 0
    End If
    Me!LeftArrow.SetFocus
End Sub
```

That completes my spinner. It has all the typi-



Hartford Computer Group

Since 1977

FOR DEEP DISCOUNTED COMPUTER PRODUCTS

CALL NOW
FOR YOUR
FREE HCG
CATALOG!

STOP PRICE SHOPPING! LOWEST PRICES GUARANTEED!
Call HCG for more details on our 100% Low Price Guarantee Policy!

COMPUTERS

COMPAQ

Desktop 575 P75 8/840MB	\$1633.84
Desktop 5100 P100 8/840MB	1766.77
Desktop 5100 P100 16/1 2GB	2199.23
Desktop 5120 P120 16/1 2GB	2315.08
Desktop 5133 P133 16/1 2GB	2481.24
Desktop 5133 P133 16/1 2GB	2658.46
Desktop 5133 P133 16/2GB	2838.31
Desktop 5133 P133 16/2GB CD	3234.46

AST

Bravo MS

P75 16/1 2GB	\$1554.95
P100 8/840MB	1387.46
P100 16/1 2GB	1709.35
P100 8/850 4xCD	1520.66
P75 8/850MB	1199.00
P100 16/1 6GB	1996.45
P100 16/1 2GB	1864.98
P100 8/850MB	1321.05
P166 16/1 6GB 4xCD 2496.96	

NEC

P75 8/1 2GB Fax/Modem CD-ROM	\$1245.00
P100 8/1 2GB Fax/Modem CD-ROM	1375.00
P120 8/1 2GB Fax/Modem CD-ROM	1450.00
P133 8/1 2GB Fax/Modem CD-ROM	1550.00
P150 8/1 2GB Fax/Modem CD-ROM	1800.00
P166 8/1 2GB Fax/Modem CD-ROM	1950.00

NEC

PowerMate P100 16/1 8GB	\$1975.00
PowerMate P100 16/1 8GB CD	2234.00
PowerMate P133 8/850MB	1799.00
PowerMate P133 16/1 6GB	2195.00
PowerMate P133 16/1 6GB CD	2468.00
PowerMate P150 16/1 8GB	2535.00
PowerMate P150 16/1 8GB CD	2875.00
PowerMate P166 16/1 8GB	2798.00
PowerMate P166 16/1 6GB CD	3179.00

MONITORS

CITR

156SD 15"	\$349.00
1765GME 17"	829.00
1765GME 17"	829.00
1765GME 17"	829.00

MAG

MX21F 21"	\$1619.95
DX1495 14"	268.00
DX1585 15"	378.00
DX1777 17"	773.00

MAGNADOCK

CM2015 15" 1024x768	\$337.00
CM2020 14" 1024x768	249.00
CM4018 17" 1280x1024	568.00
20CM84 20" 1280x1024	987.00
20CM8600 20" 1600x1280	1289.00
CM2137 21" 1600x1280	1743.12
CM4015 15" 1280x1024	386.00
7BM748 18" 640x480 Mono	114.00

NAMCO

F2-15 15"	\$558.20
F2-17 17"	895.00
F2-21 21"	1885.00
F2-17EX 17"	999.00
F2-17TS 17"	1028.00

NEC

XV15+ 15" NEW	\$465.00
XV17+ 17" NEW	752.00
XE21 21"	1678.00
XP21 21"	1945.00

NOKIA

449E 15"	\$445.00
447L 17"	679.00
445X 21"	1867.00

SONY

Multiscan 15" sxl	\$410.00
Multiscan 15" sfl	470.00
Multiscan 17" sfl	860.00

ViewSonic

ViewSonic 17" EA	\$665.00
ViewSonic 21" PS	1645.00
ViewSonic 17" PS	854.00

FAX/MODEMS

Robotics

Voice Mail NEW	\$295.94
Voice Mail NEW	CALL
Windows 95 NEW	15.95
Windows 95 NEW	20.95
Windows 95 NEW	25.95
Windows 95 NEW	30.95
Windows 95 NEW	35.95
Windows 95 NEW	40.95
Windows 95 NEW	45.95
Windows 95 NEW	50.95

Hayes

Optima 28.8 Ext	\$380.00
Optima 28.8 Ext	408.54
Optima 28.8 Ext	423.28
Optima 14.4 Ext	382.33
Optima 14.4 Ext	355.27
14.4 OnLine Express Int	\$49.99
14.4 OnLine Express Ext	79.00
14.4 OnLine Express Int	155.90
14.4 OnLine Express Ext	191.20

MOTOROLA

BSURFR 150N Ext Ayrac	\$239.00
BSURFR 150N Ext	276.00
BSURFR 150N Ext	363.00
ModemSURFR 150N Ext	186.42
ModemSURFR 150N Ext	186.42
ModemSURFR 150N Ext	186.42
ModemSURFR 150N Ext	186.42

NOTEBOOKS

NEC

2000 P100 8/840MB	\$1099.00
2000 P100 8/840MB	1099.00
2000 P100 8/840MB	1099.00
2000 P100 8/840MB	1099.00
2000 P100 8/840MB	1099.00

AST

J10 P75 8/500 D 10.4"	\$2525.00
J30 P100 8/800 A 10.4"	3053.00
J30 P100 8/800 D 10.4"	2955.00
P30 P100 8/800 D 11.3"	3737.00
P50 P133 8/800 A 11.3"	4205.10
P50 P133 8/1 2GB A 11.3"	4672.53

TEXAS INSTRUMENTS

560CD-P75 8/810MB CD Dual	\$2699.00
560CDT-P75 8/1 2GB CD Active	3650.00
TM1000-P75 8/810MB Active	2899.00
TM5100-P90 8/1 2GB Dual	3320.00
TM5100-P90 8/1 2GB Active	3620.00
TM5200-P120 8/1 2GB Active	4650.00

TOSHIBA

4100S P100 8/840MB	\$1099.00
4100S P100 8/840MB	1099.00
4100S P100 8/840MB	1099.00
4100S P100 8/840MB	1099.00
4100S P100 8/840MB	1099.00

COMPAQ

LTE 5000 P75 8/510MB 10.4" Dual	\$3750.00
LTE 5000 P75 8/510MB 11.3" Dual	4380.00
LTE 5000 P75 8/510MB 10.4" Active	4795.00
LTE 5100 P90 8/810MB 10.4" Active	5250.00
LTE 5100 P90 8/810MB CD 10.4" Active	5510.00
LTE 5200 P120 8/1 35GB 10.4" Dual	6100.00
Centura 430C P100 8/420MB 10.4" Dual	2350.00
Centura 430CX P100 8/220MB 10.4" Active	2900.00

MULTIMEDIA

Altac 5 Channel Surround Sound System	\$280.50
Altac Portable Multimedia	309.00
36 Watt, 3 Piece System	159.00
30 Watt, 3 Piece System	112.00
18 Watt Speakers	69.00
12 Watt Speakers	52.00
6" Powered Subwoofer	102.00
4" Powered Subwoofer	80.00

QuickCam for Windows	\$89.00
Performance 6x	\$366.85
Perform 6x NEW	391.82
Discov CD 6x NEW	335.11
Value CD 4x	218.16
Blaster CD 6x	225.26
Blaster CD 4x	180.90
Blaster CD 4x	119.80
Sound Blaster 16 PnP	96.00
Sound Blaster 32 PnP	145.80
Sound Blaster AWE32 PnP	217.08
Sound Blaster 3D	311.05
Wave Blaster II	113.40
PhoneBlaster	180.50

Ultra BX	\$436.57
4x/2 disc Changer	\$329.50
4x/4 Changer	263.23
6x/6 Int	328.07
6x/6 Ext	367.84
6V Int NEW	168.48

Photo PC Digital Camera NEW	\$459.00
4x Ext Recorder	\$1650.00
2x Ext Recorder	1053.00
4x Int Kit	\$103.65
4x Int SCSI Kit	222.48
4x Portable	331.45
4x Portable CD w/nd	563.20

9211 Record CD Int	\$950.45
9211 Record Ext	1153.44
6x Int CD-ROM Drive	\$217.00
6x Int Wave Table Kit	230.00
Portable CD-ROM	324.00

9211 Record CD Int	\$950.45
9211 Record Ext	1153.44
6x Int CD-ROM Drive	\$217.00
6x Int Wave Table Kit	230.00
Portable CD-ROM	324.00

BATTERY BACKUP

BackUPS 200	\$84.65
BackUPS 280	94.48
BackUPS 400	135.00
BackUPS 450	156.00
BackUPS 600	224.72
BackUPS Pro 280	142.00
BackUPS Pro 420	169.00
BackUPS Pro 650	235.00
SmartUPS 400	\$142.00
SmartUPS 450	135.00
SmartUPS 600	195.00
SmartUPS 700	249.00
SmartUPS 1000	295.00
SmartUPS 1400	419.00
SmartUPS 2200	749.00

CALL FOR OUR COMPLETE SOFTWARE SELECTION!

CHECK OUT OUR WORLDWIDE WEB SITE FOR WEEKLY SPECIALS!

REMOVABLE STORAGE

Jaz Ext 1GB	\$569.00
Jaz Int 1GB	465.00
Jaz Media 1GB	118.00
Jaz Media 1GB 5pk	452.00
Zip 100MB Parallel	\$182.00
Zip 100MB Insider	188.00
Zip Media 100	18.85
Zip Media 100 3pk	46.22
Zip 100MB SCSI	182.00
Zip Media 100 10pk	122.65

SyQuest EZ135 Int IDE	\$180.00
SyQuest EZ135 Ext SCSI	225.00
SyQuest EZ135 Ext Parallel	235.00
SyQuest EZ135MB 3.5" Cart	18.00

14.4 fax/modem w/Jack	\$90.28
14.4 fax/modem w/Jack	100.77
28.8 Cellular Ready PC Jack	279.00
28.8 fax/modem w/Jack	279.00
28.8 Ethernet Modem w/Jack 10Base-T	418.00
28.8 Ethernet Modem w/Jack Combo	438.00
28.8 Ethernet Modem 10Base-T	418.00
Ethernet Adapter w/Jack 10Base-T	129.00
Ethernet Adapter w/Jack 10Base-2	148.00

Backpack 4x w/out sound	\$269.00
Backpack 4x w/sound	375.00
Backpack 6x w/out sound	325.00
Backpack 6x w/sound	415.00
Backpack 800T Portable tape drive	99.00

Montana	\$255.00
Manner	460.00

WinSuite 14.4	\$65.00
WinSuite 14.4	199.00
WinSuite 28.8	207.00
WinSuite 28.8	214.00
WinSuite 28.8	214.00
WinSuite 28.8	214.00
WinSuite 28.8	214.00
WinSuite 28.8	214.00

28.8 Communicator	\$210.00
14.4 Communicator	89.00
28.8 Communicator w/SimpleJack	245.00
10Base-T Ethernet	99.00
SCSI Card	95.00
170MB HD Type III	305.00
280MB HD Type III	370.00

PS-CE2-10BT	\$131.85
PS-CE2-10BC	174.27
CEM2-10BT	319.00
CEM2-10BC	365.00
PS-CEM-28BT	409.00
PS-CEM-28BC	\$482.00
CM-28	259.17
PS-CT2-16STP	379.70
PS-CT2-16CTP	365.75
CNW	304.50

HCG WILL BUY BACK YOUR USED PC'S IN QUANTITY!

IL: 847-934-3380

FAX: 847-934-0157

<http://www.awa.com/hartford>

800-607-4424

CIRCLE 062 ON READER SERVICE CARD

No charge on credit! Credit cards are not charged until time of shipment. All products are trademarks. registered trademarks or service marks of their respective companies. Products, prices and programs are subject to change without notice. All returns need to have a prior Return Authorization Number (RMA) and must be in "like new" condition with original box and packing materials. Non-defective returns are subject to a restocking charge. For your protection, we ship to your verified shipping address. Any returns on IBC promotional products must include the promotional items for a valid RMA. Thank you for your business.

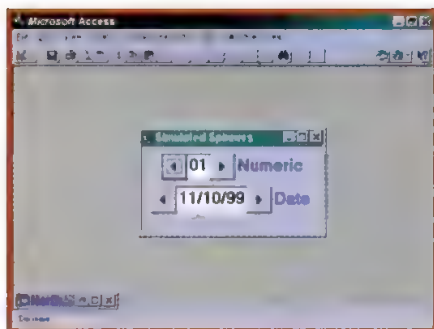


FIGURE 4: You can simulate spinner controls in Microsoft Access by creating arrow buttons and attaching the appropriate code to their On Click events.

cal attributes of a spinner and includes a minimum value check. You can also set a default value by setting the Number control's default value property.

I like this better than an OCX spinner, especially for distributed applications, as obviously there are no OLE problems with it. In addition it is not limited to preset data types, preset ranges, or preset intervals, as many spinners are.

LYLE FAIRFIELD
Puslinch, Ontario, Canada

PC MAGAZINE: Figure 4 shows sample numeric and date spinners that I created using a technique similar to Mr. Fairfield's. A spinner is a control that saves you from having to directly input a number or a date (or theoretically any type that can be incremented

or decremented). Instead, you simply click on the nearby up or down arrows to alter the value.

Spinners are not among the built-in form controls in Access 2.0 for Windows or Access for Windows 95. If you purchase the Access for Windows 95 Developer's Kit, however, you'll find that it includes a spin button OLE custom control that you can use with your Access applications. The advantage of simulating a spinner on your own instead of using an OLE custom control is that you can customize the appearance of the spin buttons to your liking. The performance characteristics of some OCXs may also make it advantageous to code your own spinners, and in doing so you avoid any OCX distribution issues.

Mr. Fairfield's technique is to set the focus to the control being altered, adjust its value, and then return focus to the spin button. While this works fine, you'll find that setting the focus isn't absolutely necessary. That is, if you don't set the focus to the control being altered, you can still click on one of the arrows to adjust the control's value. The only problem with this is that when you hold down the mouse button to spin rapidly, Windows has a tough time keeping up with the changes, and your control won't repaint quickly enough. So instead of seeing the updated value after every increment, you'll see it only when Windows manages to catch up. This makes it difficult to know when to release the mouse button.

Setting the focus back and forth between the control being changed and the spin button

effectively alleviates this problem, but you'll notice a slightly annoying flash as the focus moves between controls. Another effective approach is to skip setting the focus and instead insert a DoEvents statement after you change the value. This passes control to Windows until Windows can completely process all pending events and avoids the SetFocus flicker. In this case, the RightArrow_Click code becomes:

```
Sub RightArrow_Click ()
    Me![Number] = Me![Number] + 1
    DoEvents
End Sub
```

Because spinner controls have many uses, it makes sense to put together a few standard spin routines to avoid duplicating a lot of code. Figure 5 shows a SpinNumeric procedure that can be used to spin numbers. You pass it the name of the control whose value you want to change, the amount by which to change it, and a minimum and maximum value. For example, to spin a number within a range from 0 to 99, the On Click event code for the right and left arrows might look like this:

```
Sub RightArrow_Click ()
    Call SpinNumeric(Me![Number],1,0,99)
End Sub

Sub LeftArrow_Click ()
    Call SpinNumeric(Me![Number],-1,0,99)
End Sub
```

```
*****
' Public Sub SpinNumeric(ct1 As Control, intIncrement As
' Integer, _
' intMin As Integer, intMax As Integer)
'
' ct1 - The control to spin
' intIncrement - The increment to use
' intMin - The minimum value to allow
' intMax - The maximum value to allow
*****
Public Sub SpinNumeric(ct1 As Control, intIncrement As
Integer, _
intMin As Integer, intMax As Integer)
On Error GoTo Err_SpinNumeric

If (ct1 + intIncrement) >= intMin Then ' Check Min
If (ct1 + intIncrement) <= intMax Then ' Check Max
    ct1 = ct1 + intIncrement ' Spin it
    DoEvents
    Exit Sub
End If
End If

DoCmd.Beep ' Out of range
Exit Sub

Exit_SpinNumeric:
Exit Sub
Err_SpinNumeric:
MsgBox Err.Description
```

Resume Exit_SpinNumeric

End Sub

```
*****
' Public Sub SpinDate(ct1 As Control, strInterval As
' String, _
' intIncrement As Integer)
'
' ct1 - The control to spin
' strInterval - The Date/Time interval to use
' intIncrement - The number of intervals to increment by
*****
Public Sub SpinDate(ct1 As Control, strInterval As
String, _
intIncrement As Integer)
On Error GoTo Err_SpinDate

ct1 = CDate(ct1) ' Make sure it's a date
ct1 = DateAdd(strInterval, intIncrement, ct1) ' Spin it
DoEvents

Exit_SpinDate:
Exit Sub

Err_SpinDate:
MsgBox Err.Description
Resume Exit_SpinDate

End Sub
```



FIGURE 5: You can use the SpinNumeric or SpinDate procedures to help simulate spinner controls in Microsoft Access for Windows 95.

DISCOVER SAVINGS & MORE!



Z-NOTE MX

- 75MHz Pentium Processor
- 8MB RAM
- 256K L2 Cache
- 540MB HD
- 10.4" VGA Dual Scan
- 1MB VRAM
- Built-in 16-bit Sound Blaster-Compatible Stereo Sound System
- On-Board Stereo Speakers
- 3.5" Floppy Drive
- AccuPad Pressure-Sensitive Pointing Device
- Windows 95

AZIJ-8563-BX

List Price \$2,499



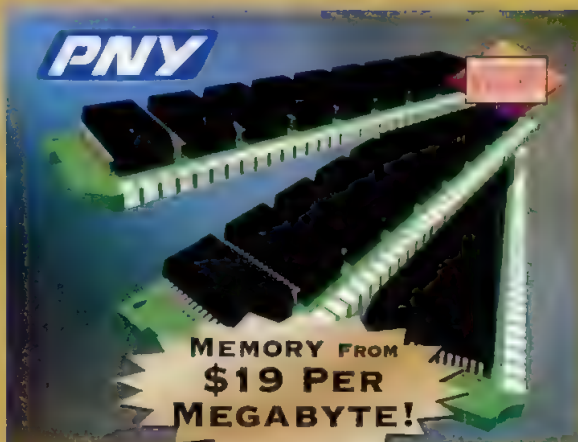
BULL

EXPRESS

30-Day Satisfaction Guarantee!
Ask For Your FREE Catalog!



\$1,999!



CALL US IF YOU DON'T FIND THE MEMORY YOU NEED

A84007-S51T08	4MB	4MB x 8, 70NS (8-Chip)	\$ 96.
A321007-S5	4MB	1MB x 32 70NS 72PIN	74.
A322007-S5	8MB	2MB x 32 70NS 72 PIN	148
A324007S-S2	16MB	4MB x 32 70NS 72PIN	320
A32807-S52	32MB	8MB x 32 70NS 72PIN	650.
A91007-S51T03	1MB	1MB x 9 70NS (3-Chip) Parity	30.
A91007-S55T09	1MB	1MB x 9 70NS (9-Chip) Parity	30.
A94007-S51T03	4MB	4MB x 9 70NS (3-Chip) Parity	99
A94007-S51T09	4MB	4MB x 9 70NS (9-Chip) Parity	99.
A361007-S5	4MB	1MB x 36 70NS 72PIN Parity	87.
A362007-S5	8MB	2MB x 36 70NS 72PIN Parity	173.
A364007-S52	16MB	4MB x 36 70NS 72PIN Parity	358.
A368007-S52	32MB	8MB x 36 70NS 72PIN Parity	715
A321006ES	4MB	1MB x 32 60NS 72PIN Non-Parity EDO	80.
A322006ES	8MB	2MB x 32 60NS 72PIN Non-Parity EDO	155.

Packard Bell



Monitor sold separately

\$1,999!

This Packard Bell System Includes:

- MPEG 1
- 1MB Video Memory
- 16 Bit 3-D Stereo Sound
- Speakers
- Telephone Answering System
- Full-Duplex Speaker Phone
- Voice View (for Data Send and Receive During Phone Conversation - Over the Same Phone Line!)
- Windows 95
- \$1400 Worth of Software!

Pentium 133MHz Minitower - LOADED with 12GB HD, 16MB RAM, 4X-CD-ROM, 28.8 modem, and MORE!

Packard Bell

Pentium 166MHz - 24MB RAM

Minitower with 2GB HD, 4X CD-ROM, 3.5" Floppy, 1MB Video DRAM.

APB16624

\$3,498!

21.5" viewable

Call us for the full-line of 3Com Networking Products at GREAT prices!



A3C16700 \$149

3Com OfficeConnect Hub/8TPO

List Price \$249

3Com HUB \$149!

3Com OfficeConnect 8-Port Hub

Epson Color Stylus IIs

- 720 dpi Color Printing
- Separate Black Cartridge
- Laser-Like Quality

\$189!

After \$30 Mail-In Rebate
 If Purchased by 8/31/95



1-800-343-6665

Hurry - Ad Prices In Effect Through 8/31/95 or While Supplies Last!

CIRCLE 222 ON READER SERVICE CARD

Worldwide Information Systems

Bull

More PC. Less Money.

Top Flight Performance At A Good Price



Intel enhanced PCI Architecture
64bit Video S3/868 w/2MB EDO RAM
16bit sound, upgr. to Wavetable design
MPEG & CD-i Movie Playback capability
Tool-free Mid-Tower Case
Windows 95 pre-installed, with CD
104 key Windows 95 keyboard, Ergonomic Mouse
Up to 200MHz clock speed
PnP Flash BIOS, Super I/O design

*"The CLR Infinity delivers."
"Top-flight performance at a good price."
PC Magazine, January 23, 1996*



PCComputing *"Fast Pentium performance
at a great price."
PC Computing, May 1996*

BEST BUY
1001 Configurations

Designed for

Microsoft®
Windows® 95

CALL NOW TO ORDER

1-800-611-1555

Internet <http://www.clrusa.com>

Mon - Fri 9am to 9pm EST
Business Lease Available



CLR Infinity P5-75EDO
75MHz Pentium® processor
TRIO64 Video/1MB
8MB EDO RAM
256K Pipeline Burst Cache
1.08GB E-IDE Hard Drive
14", N.I., 0.28mm Color Monitor
\$1259

CLR Infinity P5-100H-EDO
100MHz Pentium® processor
8MB EDO RAM
256K Pipeline Burst Cache
1.08GB E-IDE fast Hard Drive
4x CD-ROM E-IDE Drive
14", N.I., 0.28mm Color Monitor
14.4 Fax/Data/Voice Modem
\$1599

CLR Infinity P5-120EDO
120MHz Pentium® processor
16MB EDO RAM
256K Pipeline Burst Cache
1.6GB E-IDE fast Hard Drive
6x CD-ROM E-IDE Drive
14" N.I. 0.28mm Color Monitor
\$1799
with 133MHz \$1899

CLR Infinity P5-150EDO
150MHz Pentium® processor
16MB EDO RAM
256K Pipeline Burst Cache
1.6GB E-IDE fast Hard Drive
8x CD-ROM E-IDE Drive
15", N.I., 0.28mm Color Monitor
\$2199
with 166MHz \$2399

Options (all systems)

14" - 17" Monitor upgrade	\$430
15" - 17" Monitor upgrade	\$340
14.4 Fax/Data/Modem	\$60
28.8 Fax/Data Modem	\$140
8MB EDO RAM	\$210
Attec Lansing Subwoofer	\$149
SCSI options	call
128bit Video options	call



pentium®
PROCESSOR

CompuLink Delivers

At CompuLink Research we precisely match the finest components with an uncompromising design and deliver a truly dependable high performance computer. Done right, the first time.

CLR Infinity Models include

- ◆ Top performance
- ◆ Best price
- ◆ Latest technology
- ◆ Aesthetically detailed design
- ◆ Ease of access to internal components
- ◆ Easy, cost effective upgrade path
- ◆ 3 Year limited warranty
- ◆ 30 Day money back guarantee



CompuLink Research, Inc.
3949 Commerce Parkway
Miramar, FL 33025

Tel: 954-450-7061
Fax: 954-450-7062
BBS: 954-450-8056

(C) CompuLink Research, Inc. All prices and specifications are subject to change without notice. CompuLink Research, Inc. cannot be held responsible for omissions/errors in typography or photography. Technology without Compromise and the CLR logo are trademarks of CompuLink Research, Inc. The Intel inside logo and Pentium are registered trademarks of Intel Corporation. MS, Microsoft, Windows and the Windows logo are registered trademarks, and Windows NT is a trademark of Microsoft Corporation. All other trademarks are the property of the respective companies. 30-day money back guarantee does not include original or return shipping and handling charges, and applies only to CompuLink (CLR) brand products, and begins from the date of shipment. All returns require a Return Authorization Number and must be shipped in the original packaging and condition, prepaid and insured.

CIRCLE 387 ON READER SERVICE CARD

CD RECORDERS

2X CD Recorder 4X CD Reader

BEST
VALUE!

- Complete PC Internal with drive, mastering software, controller, & 5 disks \$949
- Complete PC External with drive, mastering software, controller, & 5 disks \$1019
- Complete Mac External with mastering software & 5 disks \$999

4X CD Recorder 4X CD Reader

BEST
PERFORMANCE!

- Complete PC Internal with drive, mastering software, controller, & 5 disks \$1489
- Complete PC External with drive, mastering software, controller, & 5 disks \$1559
- Complete Mac External with mastering software & 5 disks \$1539

Hewlett Packard 2Xr4Xw Complete PC Kit \$989
Smart & Friendly 2Xr2Xw Complete PC Kit \$895
Yamaha bare drive 2Xr4Xw \$749 4Xr4Xw \$1119

Call for the best pricing in the industry on recordable CD media!

CD ROM DRIVES

SCSI CD ROM (add \$90 for external)

Sanyo 4X 190ms	\$139	NEC 4X 200ms	\$129
Plexor 4.5X130ms	\$279	NEC 6X 150ms	\$289
Plexor 6X 145ms	\$329	Toshiba 6.7X 120ms	\$249
Plexor 8X 145ms	\$325	Toshiba 8X 145ms	\$299

IDE (ATAPI) CD ROM

Toshiba 4X 190ms	\$85	Teac 6X 110ms	\$155
Toshiba 6X 170ms	\$139	Teac 8X 110ms	\$189
Toshiba 8X 145ms	\$194	NEW! 10X 130ms	\$289

CD ROM CHANGERS

IDE-Internal			
NEC 4X 4Disk	\$189		
SCSI-External			
Pioneer 4.4X DRM-624X 6 Disk	190ms	256K	\$319
Pioneer 4X DRM-1804X 8Disk	300ms	612K	\$1899

7 Drive CD ROM TOWERS

Sanyo 4X \$1429	NEC 4X \$1429	Pioneer 4.4X	\$1529
NEC 6X \$2599	Toshiba 6.7X \$2599	Toshiba 8X	\$3449

(1-21 Drive towers & other brands available!)

REMOVABLES

OPTICAL DRIVES

230MB Fujitsu DynaMO Bare	\$419
230MB Fujitsu DynaMO PC Ext with 1 disk	\$439
230MB Fujitsu DynaMO Mac Ext w/software, cable, & 1 disk	\$479
2.6Gig Maxoptix Int/Ext/Mac Ext	\$2019/\$2119/\$2209
2.6Gig HP Int/Ext/Mac	\$2209/\$2309/\$2399

SYQUEST DRIVES

EZ 135MB • 13.5ms, 3600rpm, 128K buffer, 3 1/2" drive	
Internal IDE with disk / External SCSI with disk	\$189/\$198
External parallel port with 1 disk	\$249

270MB • 13.5ms, 3600rpm, 128K buffer, 3 1/2" drive	
Internal IDE (SQ3270A) / with 1 disk (SQ3270AC)	\$299/\$339
External for parallel port with 1 disk	\$489

SCSI drive (SQ3270S) / SCSI external (SQ3270X)	\$339/\$399
200MB • 15.7ms, 3200rpm, 64K buffer, 5 1/4" form factor.	
SCSI drive (SQ5200) / SCSI external (SQ5200C)	\$339 / \$399

Genuine Syquest Media Qty 2-5/5-9/10+ with drive	
44MB \$48/43/40 88MB \$53/48/45 105MB \$56/54/51	
135MB \$27/24/21 200MB \$79/74/71 270MB \$60/58/55	

IOmega DRIVES

100MB ZIP • 3.5" x 1" high form factor	
External SCSI w/ 1 disk	\$199
Parallel External w/ 1 disk	\$199
1 Gig JAZ • 3.5" x 1" high form factor	
Internal SCSI w/ 1 disk	\$499
External SCSI w/ 1 disk	\$599

Adaptec
controller
A150SCDKIT
only \$49 when
purchased with
Zipstor Jaz drive.

TAPE DRIVES

Prices include 1 free tape! Save \$10 with hard drive!

1 Gig Seagate	\$172	800MB Colorado	\$199
1.7Gig Seagate	\$229	4.0Gig Seagate	\$289

Parallel External for printer port 1 Gig \$269

SCSI TAPE DRIVES (bare, no tape)

2Gig HP DAT	\$699	2-4Gig Seagate DAT	\$799
2Gig Seagate DAT	\$699	4-8Gig Seagate DAT	\$909
2-4Gig Seagate QIC	\$379	4-8Gig HP DAT	\$949
2-4Gig HP DAT	\$799	7-14Gig Exabyte 8mm	\$1889

For backup media and software - Call us with your needs!

HOT PRODUCTS

ExaByte 8mm EXB-8700 Tape Drive

The sleek, stand alone drive features a 7 gigabyte native, or 14-gigabyte compressed capacity, backup rate of up to 60 megabyte-per-minute. Complete backup kit includes: External drive w/ controller, cable, 1 tape, 1 cleaning tape, and a CD ROM w/ Arcadia backup for DOS/Win and your choice of Arcadia for NetWare, Arcadia for NT, Cheyenne for NetWare, or Palindrome backup director.

\$1779 alone or \$1749 with hard drive purchase.
Add an Adaptec controller [A150SCDKIT] for only \$49



Plug-N-Play
Hard
Card

Out of drive bays? Looking for an easy way to upgrade your hard drive storage capacity? This hard disk card from Smart Storage Solutions is the answer. Just insert the card in a 16 bit slot. It comes preformatted and will work in any 386 or higher computer.

1Gig [SS51GIG]	\$299	2Gig [SS52GIG]	\$439
1.6Gig [SS51.6GIG]	\$399	2.5Gig [SS52.5GIG]	\$699

SCSI HARD DRIVES

SCSI	Speed	RPM	Brand	Model	Wty	Price
850MB	14ms	4500	Quantum	TB850S	3	\$195
1050MB	12ms	5400	Quantum	FB1080S	3	\$259
1050MB	9ms	5400	Seagate	ST31051N	3	\$349
1080MB	11ms	5400	Seagate	ST51080N	3	\$239
1280MB	12ms	5400	Quantum	FB1280S	3	\$279
2050MB	8.5ms	7200	Micropolis	MC4221	5	\$609
2050MB	8.5ms	7200	Micropolis	MC4221AV	5	\$685
2147MB	9ms	5400	Micropolis	MC4421	5	\$499
2147MB	9ms	5400	Conner	CFP21055	5	\$595
2147MB	9ms	7200	Conner	CFP21075	5	\$645
2147MB	9ms	5400	Seagate	ST32151N	5	\$619
2147MB	9ms	5400	Seagate	ST32430N	5	\$609
2147MB	8ms	7200	Seagate	ST152350N	5	\$675
2150MB	8ms	7200	Quantum	XP32150	5	\$639
4290MB	8ms	7200	Seagate	ST15150N	5	\$999
4290MB	9ms	5400	Seagate	ST152350N	5	\$905
4294MB	9ms	7200	Conner	CFP42075	4	\$935
4294MB	8.9ms	7200	Micropolis	MC3243	5	\$929
4294MB	8.9ms	7200	Micropolis	MC3243AV	5	\$1015
4300MB	8.6ms	7200	Quantum	XP34300	5	\$919
9091MB	12ms	5400	Micropolis	MC1991	5	\$1919
9091MB	12ms	5400	Micropolis	MC1991AV	5	\$2029
9080MB	11ms	5400	Seagate	ST410800N	5	\$1969

WIDE SCSI

2050MB	8.9ms	7200	Micropolis	MC4221W	5	\$719
2050MB	8.9ms	7200	Micropolis	MC4221WAV	5	\$769
2147MB	8ms	7200	Seagate	ST32550W	5	\$749
2176MB	8.5ms	7200	Fujitsu	M2915W	5	\$819
4294MB	8.9ms	7200	Micropolis	MC3243W	5	\$1019
4294MB	8.5ms	7200	Micropolis	MC3243WAV	5	\$1099
4294MB	8ms	7200	Seagate	ST15150W	5	\$1099
9080MB	11ms	5400	Seagate	ST410800W	5	\$2089
9100MB	12ms	5400	Micropolis	MC1991W	5	\$1939
9100MB	12ms	5400	Micropolis	MC1991WAV	5	\$2059

SCSI CONTROLLERS

Save \$10 when you purchase any SCSI controller with any SCSI drive.

ADAPTEC

Adaptec kits include controller, cable, and EZ-SCSI software to support hard drives, Optical, Removable, CD ROM.

1505 ISA 16Bit SCSI (no hard drive support)	\$60
1515 ISA 16Bit SCSI	\$97
1522 ISA 16Bit SCSI, Floppy	\$155
1530 ISA 16Bit SCSI Win 95np	\$165
1542 ISA 16Bit Busmaster SCSI, Floppy	\$270
1640 MicroChannel SCSI	\$339
2742 EISA 32Bit SCSI, Floppy	\$379
2842 Local Bus 32Bit SCSI, Floppy	\$255
2920 PCI 32Bit SCSI (PIO)	\$169
2940 PCI 32Bit SCSI (Bus Master)	\$239
2940UW PCI ULTRA WIDE SCSI	\$295
T358 EPP to SCSI adapter	\$129
T460 PCMCIA type 2, 3, or 4 to SCSI	\$189
A3940 Twin Channel PCI SCSI (14 Drives)	\$419
A3940W Twin Channel PCI WIDE SCSI	\$489
A2825KIT VESA Local Bus IDE & SCSI	\$155

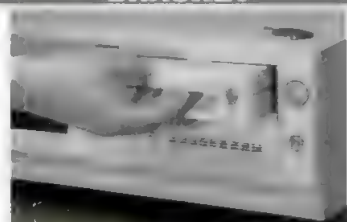
Tekram

All Tekram SCSI controllers include Corel SCSI software to support most SCSI devices.

DC300B, ISA, floppy, Bus Master	\$163
DC380B, VESA, floppy Bus Master	\$175
DC320E, EISA, Bus Master	\$219
DC390, PCI	\$115
DC390U, PCI, Ultra SCSI	\$139
DC390W, PCI, Wide SCSI	\$185
DC390F, PCI, Ultra Wide SCSI	\$209

We stock RAID controllers for PCs and Macintoshes. Call!

REMOVABLE DRIVE BRACKET



Converts any 3 1/2" hard drive into a removable drive. Great for transportability, data interchange, or security needs. Extremely high quality construction. Metal cartridge and frame, cooling fan, SCSI unit has ID select on the cartridge. Qty discounts available.

	System	Extra Cartridge	Extra Frame
IDE	\$79	\$39	\$49
SCSI	\$85	\$40	\$54
WIDE SCSI	\$129	\$64	\$75

IDE HARD DRIVES

IDE	Speed	RPM	Brand	Model	Wty	Price
541MB	14ms	3600	Conner	CF5541A	2	\$179
631MB	14ms	3800	Seagate	ST3630A	3	\$179
639MB	11ms	4500	Western Digital	AC2635	3	\$179
850MB	10ms	4500	Western Digital	AC2850	3	\$195
850MB	14ms	4500	Quantum	TB850A	3	\$195
1080MB	11ms	5400	Seagate	ST51080A	3	\$209
1080MB	9.5ms	5400	Fujitsu	M1606T	3	\$209
1080MB	14ms	3600	Conner	CF51081A	2	\$209
1084MB	14ms	4480	Maxtor	M71084A	2	\$205
1090MB	11ms	4500	Fujitsu	M1614T	3	\$195
1250MB	15ms	3600	Quantum	BF1250A	3	\$215
1275MB	14ms	3600	Conner	CF51275A	2	\$229
1280MB	12ms	5400	Quantum	FB1280A	3	\$229
1280MB	10ms	4500	Western Digital	AC31200	3	\$230
1280MB	10ms	5200	Western Digital	AC21200A	3	\$219
1282MB	10.5ms	5400	Seagate	ST51270A	3	\$229
1330MB	12ms	4480	Maxtor	M71336A	3	\$220
1620MB	14ms	3600	Conner	CF51621A	3	\$269
1624MB	10ms	5200	Western Digital	AC31600	3	\$269
1625MB	10.5ms	5400	Seagate	ST31640A	3	\$285
1626MB	12ms	4480	Maxtor	M71626AP	3	\$259
1700MB	11ms	4500	Quantum	SR31700A	3	\$255
2004MB	12ms	4480	Maxtor	M72004A	3	\$299
2100MB	10ms	5200	Western Digital	AC32100	3	\$329
2167MB	10ms	5400	Seagate	ST32140A	3	\$309
2500MB	15ms	3600	Quantum	BF2500A	3	\$349
2500MB	12ms	4480	Maxtor	M72504A	3	\$Call
2500MB	11ms	4500	Quantum	SR32550A	3	\$369
2559MB	11ms	5200	Western Digital	AC32600	3	\$399

IDE CONTROLLERS

Save \$5 when you purchase any IDE controller with any IDE drive.

TEKRAM

DC200E, ISA, 2 IDE, 2 flopp, 2 (16550) ser, 1 (EPP) par, 1 game	\$40
DC280E, VESA, 4 IDE, 2 flopp, 2 (16550) ser, 1 (EPP) par, 1 game	\$55
DC290S, PCI, 4 IDE, Bus Mastering	\$39
DC600CD, 16Bit ISA, 4 IDE, 2 ATAPI, caching, RAID 1	\$95
DC680CD, 32Bit VESA Local Bus, 4 IDE, 2 ATAPI, caching, RAID 1	\$109
DC690CD, 32Bit PCI Bus, 4 IDE, 2 ATAPI, caching, RAID 1	\$139

GSI

SCSI controllers have on board BIOS to allow any size drive to be used in any system without the use of device drivers.

GSI1533-1B, ISA, 2 IDE	\$41
GSI1533-21, ISA, 2 IDE, 4 floppy	\$53
GSI1533-32, ISA, 2 IDE, 4 floppy, 2 ser, 1 par	\$100
GSI1533-4C, ISA, 8 IDE	\$119
GSI1645-VI, VESA extender, requires GSI ISA	\$74
GSI VESA combo kit 1B4V1 \$109 21B4V1 \$121	

Promise

EIDE2300+, VESA, 4 IDE, 2 flopp, 2 ser, 1 par	\$36
EIDE4030+, VESA, 6 IDE, 2 flopp, 2 ser, 1 par, 1 game, caching	\$59

EIDE4030+, VESA, 6 IDE, 2 flopp, 2 ser, 1 par, 1 game, caching \$143



MegaHaus

2201 Pine Drive, Dickinson, Texas 77539
(713)534-3919 FAX (713)534-6580

Prices & specifications subject to change without notice. Shipping charges are not included. Returns must be in original condition and original packaging. Unopened items may be returned for a full refund. Opened items may be returned for a partial refund. All items are sold as-is. No warranties are made. The responsibility for the condition of the items is on the buyer. We do not accept returns on custom orders. All sales are final. Please call for more information. © 1996 MegaHaus.

Look for us on the Internet at <http://www.megahaus.com>

Daily specials • Complete product lineings

Special items • Plus much more

Call for our latest catalog.

Circle 283 on Reader Service Card

6/11/96 PC Magazine



PC Connection®

CUSTOM SYSTEMS OVERNIGHT • NEXT DAY DELIVERY • BEST PRICING & SELECTION!

Satellite 100cs

- 75MHz Pentium
- 8MB EDO RAM, 504MB HD
- 10.4" display
- Plug & Play
- Integrated AC adapter

NOW ONLY!
\$1999

TOSHIBA

NEW! Extensa 510

28792

\$2249

- 100MHz Pentium PCI Bus Architecture
- 8MB RAM, upgradeable to 40MB
- 10.4" dual scan display
- 810MB HDD
- 16-bit audio sound, built-in speaker & microphone
- Dual boot one-time selection of Windows for Workgroups or Windows 95

TEXAS INSTRUMENTS

ThinkPad 365E

28813

- 100MHz Cyrix 5x86C processor
- 8MB RAM (upgradeable to 24MB)
- 540MB hard drive
- ISA bus, 10.4" VGA DSTN display
- NiMH battery

NOW ONLY!
\$1999

ACER Power P100 Business Multimedia Desktop

28806

- 100MHz Pentium
- 1GB HDD, 8MB RAM, 256 K cache
- 6x CD-ROM Drive
- 3-Watt Acous speakers
- Creative Labs Vibra 16 Sound Card
- Preinstalled Windows 95, Lotus SmartSuite 1996, Quicken SE 1996, Acer Utilities

NOW!
\$1499

Monitor Sold Separately
Acer

NEW COLOR QUICKCAM!

Purchase Connectix new Color QuickCam to capture still and full-motion images and get Internet Valet FREE!

FREE with Color QuickCam purchase!

\$199.95*

28830

*Price after \$30 mfr's rebate

INTERNAL AS LOW AS \$119.95

Super capacity tape drive!

28831

LOWEST PRICE EVER!

4X Internal CD-ROM Drive

NOW ONLY! \$59.95

28832

Save Up to \$130!

Publisher CD Deluxe. Windows 95/98

ONLY \$119.95

ONLY \$229.95*

Word, Excel, Publisher CD Deluxe and Bookshelf '95—SAVE \$136!

28736

AT&T CAPITAL CORPORATION LEASING SERVICES

Available to businesses with 2+ years history. Minimum revenue \$1,000,000. In Minimum revenue of \$2,500,000. Credit record must be "Satisfactory".

For Leasing Specifics from our Corporate Account Managers
Call 800-800-0014

FREE! MEMORY INSTALLATION! OR SIMMS

4MB as low as \$89.95

8MB as low as \$169.95

16MB as low as \$349.95

32MB as low as \$699.95

*Buy a computer & memory upgrade together & we'll install your new memory upgrade at no extra charge!

COMMUNICATIONS

26906	Hayes ACCURA Message Modem v.34	\$209.95
16952	MDS PC144B Faxmodem	49.95
17471	Megahertz XJ2288 PC Card Faxmodem	289.95
4410	Microcom Carbon Copy - Windows	89.95
17963	Practical Peripherals PM288HCII v.34	159.95
26717	Sportster ISDN 128K	399.95
23211	SupraExpress 288i PnP	139.95
23610	Zoom Comstar Model 620	199.95

VIDEO

28641	Casio QV10A Digital Camera	\$399
27721	Diamond EDGE 3D - 1MB	239.95
26885	Kodak DC50 Zoom Digital Camera	999
20705	Mag Innovision MX21F 28mm	1599
21402	Matrox Millennium 4MB PCI	449
25226	Sony 15ex1 25mm	449
21795	Viewsonic 17GA 28mm	779

COMPUTERS

24248	Compaq LTE 5000 5/75 Notebook	\$2869
25827	Compaq ProLinea 5/120E	1579
24393	Compaq ProLinea 5100E Desktop	1459
23951	IBM ThinkPad 760C 90MHz 720MB	4799
26591	IBM ThinkPad 760L 90MHz 1.2GB	4099
26761	MDS 5/100CD Mini-Tower	1399
26854	MDS 5/150CD Mini-Tower	1999
25090	MDS P75 Multimedia Notebook	2699
26442	TI Extensa 560CD, P75, 10.4", 4X CD	2549
27033	TI TravelMate 5130ST P90 10.4" TFT	2549
24944	Toshiba T610CT P90, 9.5" TFT	3399
25180	Toshiba Tecra 7000CS, 120 MHz Pentium	4199

INTERNET

28923	Microsoft Internet Starter Kit	\$19.95
22160	Qualcomm Eudora Pro Email	59.95
23299	Software Ventures Internet Valet	29.95
18712	Spy Internet in a Box	39.95
24556	Surfwatch for Windows	19.95
27012	Ventana Netscape Navigator 2.0	44.95
24009	VOCALTEC Internet Phone-Windows	59.95

NEW PRODUCT!

DeskJet 680C Printer

- Print up to 6ppm
- Convenient built-in color
- 2-sided printing option
- Paper-types: banners, labels, transparencies and envelopes

NOW ONLY! \$319.95

28486

FREE! Catalog Subscription

Call Today!

OUR POLICY • VISA, MASTERCARD, AMERICAN EXPRESS, AND DISCOVER CARDS. All purchases. * Most of our products are covered by a 3-year warranty. ** All other products have a 1-year warranty. *** Some products are covered by a 3-year warranty. **** Some products are covered by a 5-year warranty. ***** Some products are covered by a 10-year warranty. ***** Some products are covered by a 15-year warranty. ***** Some products are covered by a 20-year warranty. ***** Some products are covered by a 25-year warranty. ***** Some products are covered by a 30-year warranty. ***** Some products are covered by a 35-year warranty. ***** Some products are covered by a 40-year warranty. ***** Some products are covered by a 45-year warranty. ***** Some products are covered by a 50-year warranty. ***** Some products are covered by a 55-year warranty. ***** Some products are covered by a 60-year warranty. ***** Some products are covered by a 65-year warranty. ***** Some products are covered by a 70-year warranty. ***** Some products are covered by a 75-year warranty. ***** Some products are covered by a 80-year warranty. ***** Some products are covered by a 85-year warranty. ***** Some products are covered by a 90-year warranty. ***** Some products are covered by a 95-year warranty. ***** Some products are covered by a 100-year warranty.

800-800-0004

NOW AVAILABLE WITH 16-BIT BUILT-IN SOUND OPTION!



One Portable CD-ROM Drive — Two Simple Steps



**See Us At
Comdex
Booth
#M4746**

With the backpack quad-speed CD-ROM drive, you're one cable connection away from a world of multimedia business advantages: Plug it into your PC parallel port to access a universe of CD-ROM titles. Take it with you for portable data retrieval. Or share it with other PCs.



backpack

MicroSolutions

Call Toll Free - 800.293.1214

No compatibility problems with virtually any IBM-compatible PC—Windows, DOS or OS/2. No taking your PC apart to install this quad-speed drive. Just plug it into your PC printer port—plug your printer into the backpack. A simple solution from the backpack family of tape, diskette and hard drives.

FamilyPC Rating

★★★★

132 W. Lincoln Hwy. DeKalb, Illinois 60115 • Telephone 815.756.3411 • FAX 815.756.2928 • Web Address <http://www.micro-solutions.com>

CDW - 800.736.4239 • ComputAbility - 800.558.0003 • DellWare - 800.449.3355 • Global Computer Supplies - 800.845.6225 • Inmac - 800.547.5444
Insight Direct - 800.796.1111 • Micro Warehouse - 800.367.7080 • Midwest Micro - 800.413.9856 • PCs Complete, Inc. - 800.514.4727
PC Connection, Inc. - 800.800.5555 • PC Mall - 800.555.6255 • PC Zone - 800.258.2088 • Quill - 800.789.0605 • USA Flex - 800.872.3539

Then when you click on one of the arrow buttons, the SpinNumeric procedure is called. It checks to make sure the value that would result from the change is within the range specified by the minimum and maximum values, and if so, goes ahead and changes the [Number] control by the value specified in the second argument. If the result would not be within range, the code beeps and doesn't change anything.

You can also create a simulated spinner control that adjusts a date value. Figure 5 shows a sample SpinDate procedure that you can use to change a date. You pass the routine the name of the control whose value you want to change, an indication of what interval you want to use to adjust the date, and the number of intervals to adjust with each mouse click. The second argument, the interval to use, can be any of the intervals accepted by Access's DateAdd function. For example, to spin a date control named MyDate one day at a time, you use "d" for the interval, and the On Click event code for the right and left arrow buttons becomes:

```
Sub RightArrow_Click ()
Call SpinDate(Me!MyDate),"d",1)
End Sub
```

```
Sub LeftArrow_Click ()
Call SpinDate(Me!MyDate),"d",-1)
End Sub
```

The interval argument lets you change "d" to "m" to adjust by one month each click, or "yyyy" to adjust by year. You could, for example, choose to have three "arrow" controls on each side of the MyDate control, where those on the right increment the date by one day, one month, or one year, and those on the left decrement by one day, one month, or one year.

You can download the code in Figure 5 from PC Magazine Online.—*Sal Ricciardi*

GRAPHICS

Premastering Software



I'm thinking of distributing my multimedia project via compact disk. I know I need a compact disk-recordable drive to create the disk; will I need premastering software as well? Can you explain what this software does and make some recommendations?

ELI KAHAN, Brooklyn, New York

PC MAGAZINE: If you want your multimedia application to run reliably on the broadest range of CD drives, you need premastering software. This software provides two key functions, assuring both the structural integrity of the files and cross-platform compatibility.

On the most basic level, premastering soft-

ware records information from your hard disk to a compact disk. If your system is unable to provide a fast, constant stream of data during the recording process, errors will result. Called buffer-underrun errors, these glitches make the files unreadable. Premastering software helps you to identify potential buffer underruns by performing a dry run of the recording process. The simulated recording differs from an actual recording session in only one way: The CD-R drive's laser is not at full power, in effect disabling the write mechanism. Once you've identified the cause of a buffer-underrun error, you can correct it, typically by changing configuration options (such as data rate or read/write buffer size) within the premastering program.

CD premastering programs also convert your MS-DOS-based files into the ISO 9660 format, which consists of definitions for the file structure and logical organization of a compact disk. Its primary advantage is that it can be read by PCs, Macs, and Unix systems.

In addition to these essential functions, premastering software usually gives you a number of different controls over the recording process. You should be able to choose between single-session, multisession, and multi-volume CD formats, each of which is suitable for a particular application. If, for example, you intend to send the master CD out for commercial replication, you must generate a single-session disc. It's also useful if the software can generate mixed-mode disks—that is, a CD that combines digital audio files (CD-DA is the format used for music CDs) with data and graphics (the Extended Architecture CD or the CD-ROM XA format). And although 600-plus megabytes sounds like a lot of storage space, multimedia applications that contain digital video, full-color images, and sound files can quickly exceed the capacity of a compact disk. So you should find a program that offers optimization techniques. For example, reducing the number of tracks on a CD can save a substantial amount of space by eliminating the 2 seconds—or 300K—of blank space typically required to separate tracks.

Now that you understand some of the basic functions offered by premastering software, you're ready to make a choice. If you haven't yet purchased a CD-R drive you may be in luck, because more manufacturers are bundling premastering software with the hardware. But if the bundled software doesn't meet your needs, consider purchasing a separate application. My search turned up four Windows-based programs. All of the programs require a SCSI interface for the drive, and most support only specific models of CD-R drives.

CDR Publisher, from Creative Digital Research (408-255-0999), runs under Windows 3.x and is priced at \$495. This program is distinguished by its ability to create hybrid CDs under Windows. The CDs you create with

CDR Publisher can contain not only the ISO 9660 format, but Mac HFS and Unix ISO 9660 with Rock Ridge Extension formats as well. This is an essential feature for program developers who want to distribute different versions of a program on a single compact disk. You'll find that though other products can create hybrid disks, they do so only if you're running the Mac version of their software.

Incat Systems, recently purchased by Adaptec (800-774-6228), offers versions of Easy CD Pro for Windows 3.1, Windows NT, and the Mac. The pricing structure changes depending upon the speed of your CD-R drive. Easy CD Pro for a double-speed recordable CD drive costs \$249, while the quad-speed and 6X versions cost \$349 and \$549, respectively. In contrast to the competition, which supports only specific models of CD-R drives, Incat claims its product is compatible with every SCSI drive on the market.

SimpliCD, from Young Minds Inc. (800-496-4237), runs under Windows 3.1 and is priced at \$284. This product may be of special interest to those using CD-R technology for archiving purposes. An integrated backup and restore utility and support of capaCD (a CD-ROM data compression package available as an add-on option) allow SimpliCD to store up to 4GB of data on a single disk.

The \$249 Corel CD Creator, from Corel Corp. (800-772-6735), is the only program currently shipping a Windows 95 version (in addition to Windows 3.1 and Mac versions). Targeted at the novice user, CD Creator offers a Disk Wizard that essentially walks you through the process of disk layout and creation. CD Creator also offers automated tools to help you create jewel-case inserts.

For more information, take a look at the feature "Create Your Own CD" and the PC Tech story on premastering software, both in our issue of April 9, 1996.—*Luisa Simone* □

HOW TO CONTACT US--

Send your tips and questions to our advisors in any of the following ways:

COMPUSERVE 72241,104

FAX 212-503-5799

INTERNET MAIL

pcmag@zd.com

MCI MAIL Solutions, 556-3896

U.S. MAIL Solutions, *PC Magazine*,
One Park Ave., New York, NY
10016-5802 (Please send a floppy
disk and printout.)



*If we print your tip,
you'll receive \$50 plus a
PC Magazine T-shirt.
We regret that we
cannot answer letters
individually.*

NECX Direct

**Mail Order Company of Choice
for Business, Education
and Government!**

NOTEBOOKS

AST
Ascentia P30 5/100
8/800MB Dual 4XCD
\$3250

Ascentia P30 5/100 8/800MB Dual 4XCD \$3250
Ascentia P30 5/100 8/800MB Dual 4XCD 4200
Ascentia P30 5/100 8/800MB Dual 4XCD 4650

IBM

760L 5/90 8/810MB Active	\$4050
760LD 5/90 8/810MB Active	4350
760C 5/120 8/1080MB 12.1" Active	5800
760C 5/120 8/720MB 12.1" Active	5300
760CD 5/120 8/1200MB 12.1" Active	6600

NEC

2200C 5/75 8/810MB Active	\$2300
4000C 5/75 8/540MB Active	3150
4000CD 5/75 8/810MB Active	3600
4050CD 5/90 8/810MB Active	4300
4050H 5/90 8/810MB Active	3900

TEXAS INSTRUMENTS

Extensa 450T DX4/75 4/340MB Active	\$1450
Extensa 550 5/75 8/524MB Dual	1880
Extensa 560CD 5/75 8/810MB Active	2680
Extensa 560CDT 5/75 8/1200MB Active	3600
TM5100 5/90 8/1200MB Active	3350
TM5200 5/120 8/1200MB Active	4200
TM5300 5/133 8/1200MB Active	5200

TOSHIBA

T410CS 5/90 8/810MB Dual	\$3100
T610 5/90 8/720MB Active	3900
T700CS 5/120 8/1200MB Dual	3900
T720CDT 5/133 16/1200MB 12.1" Act	6200

COMPUTERS

515MCX 5/133
16/1620MB 4XCD
\$2450

510C 5/75 8/850MB \$1400
510MC 5/100 8/1280MB 4XCD 1730
515CD 5/100 8/1280MB 4XCD 1630
515MC 5/133 8/1620MB 1780
510MCX 5/100 8/1280MB 1800
515MCX 5/133 8/1280MB 4XCD 2450
515MCX 5/166 8/1280MB 4XCD 2980

AST

Bravo LC 5/100 16/1200MB	Price
Bravo MS 5/120 16/1600MB	\$1430
Bravo LC 5/133 8/1200MB	1900
Bravo LC 5/166 16/1600MB	1550
	1900

MULTIMEDIA

Multimedia Kit
\$320

Multimedia Kit \$320
Multimedia Kit \$196

CREATIVE

Sound Blaster AWE32 PNP	Price
Discovery CD 8X Internal	\$211
Blaster CD 8X IDE Internal PNP	225
Performance 6X PNP	390

MONITORS

ViewSonic
17GA Multimedia
27mm 1280 x 1024
\$725

14ES 14" 28mm \$265
15ES 15" 28mm 350
15GA 15" 27mm 470
17GS 17" 27mm 645
20G 20" 28mm 1150
21FS 21" 25mm 1580

CTX

1451C 14" 28mm	Price
1451CLR 14" 28mm	\$233
1565D 15" 28mm	242
1765GMe 17" 27mm	350
1765GMe 17" 26mm	.640
17XA 17" 25	695
20G 20" 28mm	910
	1100

EMM

DX1495 14" 28mm	\$266
DX1595 15" 28mm	375
DX1795 17" 26mm	655
MX21F 21" 28mm	1480

DIAMOND

Diamond Scan 15HX 15" 28mm	\$395
Diamond Scan 17HX 17" 26mm	805
Diamond Pro 17TX 17" 25mm	975
Diamond Pro 21TX 21" 30mm	1730

NEC

Multisync XV15+ 15" 28mm	\$470
Multisync XV17+ 17" 28mm	795
Multisync XP17 17" 28mm	1030
Multisync XE21 21" 28mm	1780
Multisync XP21 21" 28mm	2150

SONY

CPD-1425 14" 25mm	\$292
Multiscan 15dl 15" 25mm	465
Multiscan 15ul 15" 25mm	415
Multiscan 17dl 17" 25mm	850
Multiscan 20dl 20" 30mm	1650

VIDEO CARDS

Graphics Xpression
2MB PCI DRAM
\$125

Graphics Xpression 1MB ISA \$102
Graphics Xpression 2MB VLB 148
WinTurbo 2MB PCI 227
Graphics Pro Turbo 2MB PCI 250
Graphics Pro Turbo 4MB PCI 385

DIAMOND

Sealth 64 Graphics 2200 2MB DRAM PCI	Price
Sealth 64 Video 3200 2MB VRAM PCI	\$133
Edge 3D 2200XL 2MB PCI DRAM	248
Edge 3D 3240XL 2MB PCI VRAM	264
Edge 3D 1400XL 4MB PCI VRAM	360
Javelin Video 1400XL 4MB PCI	500
	405

3M

9FX Vision 330 2MB VLB	Price
9FX Motion 331 2MB PCI DRAM	\$194
9FX Motion 771 2MB PCI	183
9FX Motion 771 4MB PCI	280
Imagine 128 4MB PCI VRAM	425
	595

PRINTERS

EPSON
Stylus Color II Inkjet
\$30 mail-in rebate
\$299

Stylus Color II 360 dpi Color Inkjet \$210
Stylus Color Pro 720 dpi Color Inkjet 499
Stylus 1500 720 dpi Color Inkjet 885
Stylus Color ProXL 720 dpi Color Wide 1700

Canon

BJC-4100 720x360 dpi Color Inkjet	Price
BJC-610 720 dpi Color Inkjet	\$290
LBP-460 600 dpi Laser	435
	365

HEWLETT PACKARD

DeskJet 340 300 x 600 dpi Black Portable	\$291
DeskJet 600C 600 dpi Color Inkjet	241
DeskJet 660C 600 dpi Color Inkjet	350
DeskJet 820CXI 600 dpi Color Inkjet	385
DeskJet 1600C 600 dpi Color Inkjet	1330
LaserJet 5L-FS 600 dpi Laser	495
LaserJet 5P 600 dpi Laser	860
LaserJet 5MP 600 dpi Laser	1000
LaserJet 5SI 600 dpi Laser	2780
Color LaserJet 5300 300 dpi Color Laser	5800

LEXMARK

Optra E 600 dpi Laser	\$545
Optra R+ 1200 dpi Laser	1400
Optra R+ 1200 dpi Laser	1600
Optra Lx+ 1200 dpi Laser	1930
Optra Lx+ 1200 dpi Laser	2600
Optra C 600 dpi Color Laser	6100

OKIDATA

OKIJET 2010 600x300 dpi Color Inkjet	\$320
OL600e 600 dpi LED	385
OL610e 600 dpi LED	490
OL610e/PS 600 dpi LED PostScript	685
OL810e 600 dpi LED	745
OL810e/PS 600 dpi LED PostScript	1080
OL1200 600 dpi LED	1080
OL1200/PS 600 dpi LED PostScript	1330

SCANNERS

HEWLETT PACKARD
ScanJet 4C Flatbed
600 dpi Color
\$935

ScanJet 4P 300 dpi Color/Grayscale Flatbed \$485
ScanJet 4S 300 dpi Desktop 293
ScanJet 4SI 300 dpi Ethernet Desktop 2380

EPSON

Action Scanning System II 300 x 600 dpi	Price
ES-1000C 400 x 800 dpi Color Flatbed	\$420
ES-1200C 600 x 600 dpi Color Flatbed	730
ES-1200C Pro 600 x 600 dpi Color Flatbed	935
	1130

MICROTEK

ScanMaker E1 300 x 600 dpi Color Flatbed	\$360
ScanMaker E6 600 x 1200 dpi Color Flatbed	545
ScanMaker E6 Pro 600 x 1200 dpi Color	725

UMAX

Vista-S6E SOHO 300 x 600 dpi Color Flatbed	\$375
Vista-S8 PCLE2 400 x 800 dpi Color Flatbed	645
Vista-S12 PCLE2 600 x 1200 dpi Color Flatbed	735
Gemini D-16 PC LE2 400 x 800 dpi	1300
Gemini D-16 PC PRO2 400 x 800 dpi	1400
PowerLook II PCPRO2 w/UTA 600 x 1200 dpi	2230

MODEMS

SPORTSTER
Sportster 28.8 Voice
V.34 Data/Fax Ext.
\$181

Sportster Windows Modem 28.8 \$135
Sportster 28.8/Fax PCMCIA 285

CARDINAL

MVP 28.8 Int. Fax/Modem	Price
MVP 28.8 Int. Voice/Fax/Modem	\$133
MVP 28.8V Ext. Voice/Fax/Modem	158
	176

PM144HC II 14.4/Fax	\$63
PM144MT II 14.4/Fax	.75
PM288HC II V.34 28.8/Fax	141

STORAGE

WESTERN DIGITAL
Caviar
1600MB EIDE
\$264

PM288MT II V.34 28.8/Fax 164
Caviar 615MB EIDE \$178
Caviar 850MB EIDE 191
Caviar 1280MB EIDE 219

CONNER

FilePro 615MB EIDE	Price
FilePro 850MB EIDE	\$181
FilePro 1275MB EIDE	201
	220

QUANTUM

Fireball 1280MB SCSI	\$251
Fireball 1280MB EIDE	218
Trailblazer 850MB EIDE	191
Trailblazer 850MB SCSI-2	189

Seagate

ST1220A 1.0GB EIDE	\$214
ST12140 2.0GB 3.5" EIDE	325
ST1520N 4200MB 3.5" SCSI II	999

ZIP 100MB PC Parallel	\$194
Ditto Tape Drive 3200MB Internal	235
Ditto Tape Drive 3200MB External	289

Jumbo 1400MB	\$225
T1000 800MB Internal	156

SOFTWARE

Microsoft
Visual Basic Pro 4.0
Windows 95 Upgrade
\$80

Visual C++ Windows NT CD \$83
Visual C++ Windows 95 Comp Upgrade 211
Visual C++ Sub. V4.0 Windows CD Comp Upgrade 310
Visual FoxPro V3.0 Windows Upgrade 90

Lotus

SmartSuite 96 Windows 95 CD-ROM	Price
Approach 96 Windows 95 CD-ROM	\$380
	93

- Award winning reseller!
- 20,000 brand name products
- Knowledgeable sales consultants
- Volume pricing!
- Overnight delivery
- Great service!
- Daily product specials

http://www.necx.com
800-961-9223



Purchase orders, checks and money orders welcome. Prices and availability subject to change without notice. Shipping and handling charges are additional and not refundable. All returns require a Return Merchandise Authorization number issued by NECX Direct Customer Service. All products are covered by the original manufacturer's warranty. Not responsible for typographical errors. NECX and NECX Direct are registered service marks of New England Circuit Sales, Inc. (NECX) ©1996. All other marks remain the property of their respective companies.



YOU'RE GOING GET MOBILE

COMPUTER DISCOUNT WAREHOUSE



new!



IBM® ThinkPad® 760 Series

- ◆ 90MHz or 120MHz Intel Pentium® processor ◆ 8MB RAM, expandable to 64MB ◆ 810MB, 1.08MB or 1.2GB hard drive ◆ 10.4" or 12.1" TFT active-matrix color display ◆ 28.8K bps data/fax modem (760C/CD) ◆ 16-bit audio with Sound Blaster® support ◆ Integrated microphone and stereo speakers ◆ 3-year limited warranty

760L 90MHz, 10.4" TFT, 810MB hard drive	\$4249⁰⁰	CDW 64522
760LD 90MHz, 10.4" TFT, 810MB hard drive, 4X CD-ROM	\$4549⁰⁰	CDW 64523
760C 120MHz, 12.1" TFT, 1.08MB hard drive	\$5999⁰⁰	CDW 64521
760CD 120MHz, 12.1" TFT, 1.2GB hard drive, 4X CD-ROM	\$6899⁰⁰	CDW 64518

TEXAS INSTRUMENTS

TravelMate 5000 Series

Intel Pentium® processor power and PCI bus for maximum performance

New 120MHz and 133MHz models!

- ◆ 90MHz, 120MHz, or 133MHz Intel Pentium® processor ◆ 256KB Level 2 cache ◆ 8MB RAM standard, expandable to 32MB ◆ Removable 1.2GB hard drive ◆ 10.4" or 11.3" SVGA active-matrix color display with 2MB VRAM ◆ Integrated 16-bit sound card, internal speaker and microphone ◆ PCMCIA slot accepts one Type III or two Type I/II ◆ 3-year parts and labor warranty

TMS100 90MHz, 10.4" display	\$3389⁰⁰	CDW 65104
TMS200 120MHz, 11.3" display	\$4614⁰⁰	CDW 65064
TMS300 133MHz, 11.3" display	\$5286⁰⁰	CDW 65063
T1 DockMate Not Ready	\$349⁰⁰	CDW 65067

Extensa 560 Series

Extraordinary value and performance



- ◆ 75MHz Intel Pentium® processor ◆ 8MB RAM std., 40MB max. ◆ 810MB or 1.2GB hard drive ◆ 10.4" dual-scan or TFT active-matrix color display ◆ Quad-speed CD-ROM, interchangeable with floppy drive ◆ 1-year limited warranty

560CD 810MB hard drive, dual-scan	\$2701⁴⁵	CDW 64095
560CDT 1.2GB hard drive, active-matrix	\$3657⁴⁵	CDW 64096



TOSHIBA

new!



Toshiba Tecra 720CDT

- ◆ 133MHz Intel Pentium® processor ◆ 16MB RAM std., 144MB max. ◆ 1.2GB removable hard drive ◆ 6X CD-ROM drive ◆ 12.1" TFT active-matrix color display ◆ Integrated 28.8K bps (V.34) modem ◆ Lithium Ion battery

720CDT **\$7279⁰⁰** CDW 66319

Call CDW for details on Toshiba's Tecra 760 models with the 133MHz Pentium® processor, 1.2GB removable hard drive and 11.3" color display!

Tecra 700CS 8MB DRAM, dual-scan	\$3868⁰⁰	CDW 61419
Tecra 700CT 16MB DRAM, active-matrix	\$4833⁰⁰	CDW 61420
Tecra 700 4X CD-ROM drive	\$293⁰⁰	CDW 57576

Toshiba Portege 610CT

Ultra-portable 90MHz Pentium® processor performance!

- ◆ 90MHz Intel Pentium® processor, 8MB EDO RAM ◆ 720MB hard drive ◆ 9.5" active-matrix color display ◆ Weighs less than 5 lbs.

\$3888⁹⁸ CDW 61156



Toshiba Satellite Pro 410CS and 410CDT

Multimedia versatility and Pentium® processor power

- ◆ 90MHz Intel Pentium® processor ◆ 8MB EDO RAM std., 40MB max. ◆ 772MB hard drive ◆ 11.3" dual-scan (410CS) or active-matrix (410CDT) color display ◆ Swappable 4X CD-ROM drive (410CDT only) ◆ Integrated audio: WAV, MIDI and Sound Blaster® Pro compatible

410CS	\$3135⁰⁰	CDW 61734
410CDT	\$4319⁰⁰	CDW 61735

11.3" display!



Toshiba Satellite Pro 100CS

Value-packed mobile computing solution

- ◆ 75MHz Intel Pentium® processor ◆ 8MB EDO RAM std., 40MB max. ◆ 500MB hard drive ◆ 10.4" dual-scan display ◆ NiMH battery ◆ Integrated AC adapter ◆ 6.9 lbs.

\$1939⁶⁵ CDW 64741



Toshiba T2130CS

75MHz performance, expandability and value!

- ◆ IntelDX4™ 75MHz CPU ◆ 8MB RAM, 500MB hard drive ◆ 10.4" dual-scan color display ◆ Internal AC adapter ◆ Includes choice of pre-loaded Windows V3.11 or Windows 95



\$1578⁵³ CDW 61150

Visit our newly redesigned web site!

www.cdw.com



PLACES AT CDW®!

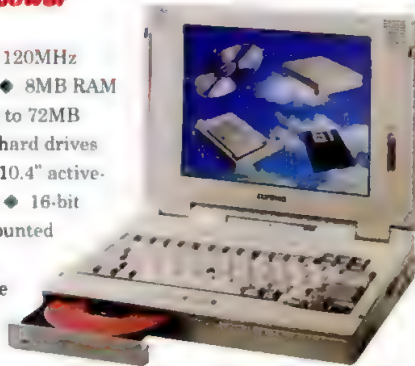


COMPAQ **new!** at CDW®!

LTE 5000 Series

The ultimate in power and flexibility

- ◆ 75MHz, 90MHz or 120MHz Pentium® processors ◆ 8MB RAM standard, expandable to 72MB
- ◆ 810MB or 1.35GB hard drives
- ◆ 11.3" dual-scan or 10.4" active-matrix color displays ◆ 16-bit audio with display mounted stereo speakers and integrated microphone
- ◆ Pre-loaded Windows® 95, Windows V3.1, MS-DOS V6.0 ◆ Optional CD-ROM drive available



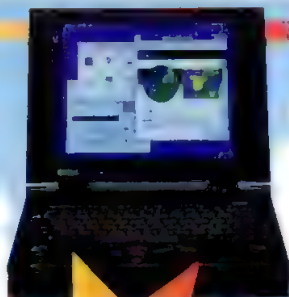
LTE 5000 75MHz, 810MB hard drive, 11.3" dual-scan	\$3264¹⁷	CDW 60596
LTE 5100 90MHz, 810MB hard drive, 10.4" active-matrix	\$4417¹⁷	CDW 60599
LTE 5200 120MHz, 1.35GB hard drive, 10.4" active-matrix	\$4801¹⁷	CDW 60600
LTE 5000 Series CD-ROM drive	\$408¹⁴	CDW 65149



HP OmniBook 5000 Notebook PC

High performance at mainstream prices

- ◆ 90MHz or 120MHz Intel Pentium® processor
- ◆ 16MB RAM expandable to 64MB ◆ 1.2GB hard drive
- ◆ Synchronous 256K L2 cache ◆ 10.4" TFT active-matrix color display with SVGA (800 x 600) resolution ◆ Plug and Play compatible ◆ 3-year limited warranty



Call for details on the new HP Omnibook 5500 Series Notebook PCs

5000CTS 90MHz, 16MB, SVGA	\$5495¹⁴	CDW 65460
5000CTS 120MHz, 16MB, SVGA	\$6072¹⁷	CDW 65467



NEC

Versa V Series

Superior NEC performance and value

- ◆ 8L-enhanced IntelDX2™ 50MHz or IntelDX4™ 75MHz CPU ◆ 4MB RAM, expandable to 20MB (V/50C) or 32MB (V/75C) ◆ 340MB or 540MB removable hard drive ◆ 9.5" or 10.1" TFT active-matrix color display ◆ PCMCIA slot: two Type II or one Type III

V/50C 50MHz, 340MB hard drive, 9.5" display	\$1269⁰⁰	CDW 44301
V/75C 75MHz, 540MB hard drive, 10.1" display	\$1499⁰⁰	CDW 53655

Versa 4000 Series

Innovative multimedia notebooks

- ◆ 90MHz or 120MHz Intel Pentium® processor
- ◆ 8MB RAM ◆ 10.4" or 10.1" color display
- ◆ Standard 4X or optional 2X CD-ROM Pak

4050C 90MHz, 810MB hard drive, 10.1" active-matrix, 4X CD-ROM	\$4499⁰⁰	CDW 65815
4050H 90MHz, 810MB hard drive, 10.4" high-res active-matrix	\$4499⁰⁰	CDW 55177
4080H 120MHz, 1GB hard drive, 10.4" high-res active-matrix	\$4999⁰⁰	CDW 61600

Pre-loaded Windows 95

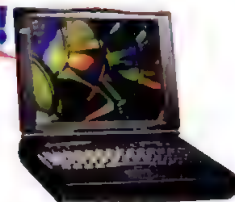


AST

Ascentia P50

- ◆ 133MHz Intel Pentium® processor
- ◆ 8MB RAM std., expandable to 40MB
- ◆ 800MB or 1.2GB removable hard drive
- ◆ 11.3" TFT active-matrix SVGA color display ◆ Interchangeable 4X CD-ROM
- ◆ 3-year limited warranty w/48-Hour Rapid Repair for 1st year

P50 CTS11 800MB hard drive	\$4221¹⁰	CDW 65840
P50 CTS11 1.2GB hard drive	\$4685⁵⁵	CDW 65841



Ascentia J30

Progressive features and advanced ergonomics

- ◆ 100MHz Intel Pentium® processor
- ◆ 8MB RAM std., 40MB max. ◆ 800MB removable hard drive ◆ 10.4" color display
- ◆ Integrated 14.4K bps data and fax modem
- ◆ Integrated ESS 16-bit Sound Blaster® compatible audio and built-in speakers
- ◆ 5.8 lbs. ◆ 3-year limited warranty

Ascentia J30 CTS10 dual-scan display	\$2629²²	CDW 64482
Ascentia J30 CTS10 active-matrix display	\$2808⁵⁰	CDW 64483



The Intel Inside® Logo and Pentium® are Registered Trademarks of Intel Corporation

CDW® sells for less and services you better!™
800-326-4CDW (4239)

FREE
configuration
of your new
notebook
purchase from
CDW!

COMPUTER DISCOUNT WAREHOUSE



NOTEBOOK ACCESSORIES TO GO!

COMPUTER DISCOUNT WAREHOUSE



NEW!

XJ4288

Cellular-capable PC Card modem with XJACK Connector

Megahertz® 28.8K bps cellular-capable PC Card modems with XJACK® connectors offer improved usability, compatibility and reliability. The built-in XJACK connector pops out to hook to a standard phone cord, or use a Megahertz cable to connect the card directly to your

cellular phone*. Includes Digital Line Guard, Flash ROM, Cable Sensor, Windows data/fax software, and now Smart Battery Saver, Smart Dialer and dual cellular protocols.

* Cellular phone cable sold separately.



\$293⁵³

CDW 66883

XJ1144 14.4.....**\$73¹¹** CDW 27680

XJA2144 14.4** **Special Purchase! \$59⁰⁰** CDW 67783

**Includes IBM and Apple software drivers



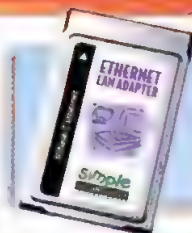
10BASE-T Ethernet PC Card

Instant networking for mobile computer users

- ◆ OS/2 Warp™, Windows® NT, DEC® Pathworks, LAN Manager, Windows® 3.x and Windows® 95 compatible
- ◆ Positive locking mechanism on cable interface prevents accidental disconnects
- ◆ Plug and Play compliant, hot-swappable
- ◆ Additional network support includes NDIS 2.1, 3.0 and 3.1, and ODI drivers
- ◆ 5-year warranty

\$77⁸⁶

CDW 43491



3Com EtherLink III

Parallel Tasking™ Ethernet PCMCIA adapters

Parallel Tasking means better performance!

- ◆ Quicker system response, faster data transfers, and lower power consumption with Parallel Tasking technology
- ◆ Highly integrated design in one chip for trouble-free operation and low cost
- ◆ Install and auto-configure in less than 3 minutes
- ◆ Includes cables, device drivers and user guides
- ◆ Guaranteed compatibility with leading notebooks or your money back within 1 year of purchase
- ◆ Lifetime warranty

3CS59-TP 10BT

\$156⁷⁶

CDW 61088

3CS59C-Combo

\$201²⁹

CDW 61902

3CS62 Ethernet/28.8 modem

\$379⁸⁴

CDW 57153

**Money-Back
Compatibility
Guarantee**



Why Simple Technology? We manufacture all of our memory products so you can be assured of the highest level of quality and reliability. Every Simple Technology memory product is:

- 100% tested
- Backed by a Lifetime Warranty
- Guaranteed compatible
- Supported by free unlimited technical support
- Designed to meet or exceed OEM specifications

LIFETIME WARRANTY

INDIVIDUALLY TESTED
100% COMPATIBLE

FREE!

Receive FREE installation of memory upgrades when you purchase a CPU or printer from CDW!

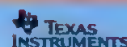
MEMORY UPGRADES



ThinkPad 701C Series	4MB	\$179.27	52734
	8MB	\$202.88	52716
	16MB	\$612.80	52736
ThinkPad 760 Series	4MB	\$124.84	62887
	8MB	\$307.29	62704
	16MB	\$609.80	62189



Versa V Series	4MB	\$179.58	30555
	8MB	\$344.59	30557
	12MB	\$489.40	43231
	16MB	\$611.04	31342
	20MB	\$699.05	43040
Versa 4000 Series	32MB	\$1243.21	43041
	4MB	\$186.19	57652
	8MB	\$344.59	56499



Extensa Series	4MB		59864
	8MB		59865
	16MB		59866
TravelMate 5000 Series	8MB		58308
	16MB		58309

TOSHIBA

Satellite Pro 400 Series	8MB	\$479.30	63086
	16MB	\$739.88	63087
	32MB	\$1467.19	61117
Portege 610CT	4MB	\$249.96	58086
	8MB	\$447.35	58087
	16MB	\$765.37	58088
	32MB	\$1628.87	58089
Tecra 700 Series	8MB	\$485.69	62119
	16MB	\$857.22	61471
	32MB	\$1616.90	63766
T2100, T2150	4MB	\$189.52	52810
	8MB	\$361.83	52811
	16MB	\$629.13	52812
	24MB	\$938.72	52813

Advertised prices effective until June 15, 1996

If you don't see it, call! We carry Simple Technology's complete line of memory products.

Visit our newly redesigned web site!

www.cdw.com



CDW® SELLS IT ALL FOR LESS!



NEC new!

MultiSync M500 and M700 15" and 17" color monitors

Superior multimedia display performance

- ◆ M500 15" (13.8" viewable image size)
- ◆ M700 17" (15.6" viewable image size)
- ◆ 1280 x 1024 maximum resolution
- ◆ 75Hz at 1024 maximum refresh rate
- ◆ .25mm dot pitch
- ◆ Integrated 2-watt stereo speakers and microphone
- ◆ Plug and Play compatible
- ◆ MPR II, Energy Star and NUTEK compliant
- ◆ 3-year limited warranty



M500 \$569.01 CDW 66451
M700 \$873.86 CDW 66452

new! Simple TECHNOLOGY

28.8 Communicator with SimpleJack™

- ◆ Direct-connect in-line RJ-11 phone connector
- ◆ 28,800 bps (V.4 and V.FC) data
- ◆ 14,400 bps fax
- ◆ Cellular ready with optional connector card
- ◆ MNP10 EC
- ◆ TX CEL
- ◆ Voice recording (with integrated sound)
- ◆ Includes communications software
- ◆ Windows 3.11 approved
- ◆ PCMCIA Type II

\$261.31 CDW 66869

28.8 Communicator \$297.87 CDW 56057
14.4 Communicator \$95.83 CDW 56913

intel Pentium OverDrive Processors

The ultimate PC upgrade option

Available Intel Pentium OverDrive processor-based system and watch your software fly

With a single chip that increases processor-based system and watch your software fly. With a single chip that increases processor-based system and watch your software fly. With a single chip that increases processor-based system and watch your software fly.



*Requires 233/233 pin socket only. Intel's application benchmark system is a 486MHz Pentium processor-based system (16MB RAM, 256K external cache, ATX M5111) (side-ord) upgraded with a 120MHz Pentium OverDrive processor

From:	Pentium 60/66 MHz	Pentium 75MHz	Pentium 90MHz
Upgrade to:	Pentium 120/133MHz	Pentium 125MHz	Pentium 150MHz
	\$339	\$339	\$414

Altiris	Altiris	Altiris	Altiris
Altiris	Altiris	Altiris	Altiris
Altiris	Altiris	Altiris	Altiris
Altiris	Altiris	Altiris	Altiris
Altiris	Altiris	Altiris	Altiris
Altiris	Altiris	Altiris	Altiris
Altiris	Altiris	Altiris	Altiris
Altiris	Altiris	Altiris	Altiris
Altiris	Altiris	Altiris	Altiris
Altiris	Altiris	Altiris	Altiris

Microsoft Word for Windows 95

3.5" \$266.94 CDW 55607
3.5" upgrade \$94.05 CDW 55606

Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD
Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD
Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD
Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD
Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD
Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD
Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD
Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD
Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD
Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD	Corel Gallery 2 WIN CD

MACROMEDIA Director Multimedia Studio V2

3.5" \$889.47 CDW 66061
3.5" upgrade \$458.67 CDW 66062

Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2
Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2
Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2
Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2
Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2
Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2
Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2
Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2
Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2
Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2	Macromedia Director Multimedia Studio V2

WINDOWS 95 SOFTWARE

Microsoft Office 95	Microsoft Office 95	Microsoft Office 95	Microsoft Office 95
Microsoft Office 95	Microsoft Office 95	Microsoft Office 95	Microsoft Office 95
Microsoft Office 95	Microsoft Office 95	Microsoft Office 95	Microsoft Office 95
Microsoft Office 95	Microsoft Office 95	Microsoft Office 95	Microsoft Office 95
Microsoft Office 95	Microsoft Office 95	Microsoft Office 95	Microsoft Office 95
Microsoft Office 95	Microsoft Office 95	Microsoft Office 95	Microsoft Office 95
Microsoft Office 95	Microsoft Office 95	Microsoft Office 95	Microsoft Office 95
Microsoft Office 95	Microsoft Office 95	Microsoft Office 95	Microsoft Office 95
Microsoft Office 95	Microsoft Office 95	Microsoft Office 95	Microsoft Office 95
Microsoft Office 95	Microsoft Office 95	Microsoft Office 95	Microsoft Office 95
Microsoft Office 95	Microsoft Office 95	Microsoft Office 95	Microsoft Office 95

MOTOROLA new!

OnlineSURFR

Everything you need for total Internet setup

- ◆ Authentic ITU V.34 technology
- ◆ 28,800 bps to 100 bps high-speed data
- ◆ 14,400 bps speed data
- ◆ 100 bps high-speed fax
- ◆ ITU Group III compatible
- ◆ ITU V.42bis and MNP 2.5
- ◆ 16-bit compression
- ◆ Includes Spay Mouse Internet Web browser, e-mail and news reader, home page creator, Gopher, FTP, Internet Phone and comprehensive Internet manual
- ◆ 3-year warranty



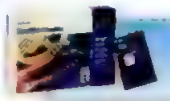
External \$179.60 CDW 66332
Internal \$171.18 CDW 66333

DIAMOND new!

Stealth64 Graphics 2120 DRAM Graphics Accelerator

Easy-to-use for the novice, powerful features for the professional

- ◆ PCI bus architecture
- ◆ 1MB DRAM
- ◆ Upgradable to 2MB
- ◆ 1280 x 1024 maximum noninterlaced resolution
- ◆ Flicker-free refresh to 120Hz
- ◆ 64-bit graphics performance
- ◆ S3 Video Series controller
- ◆ 5-year warranty



\$97.96 CDW 66333

new! ViewSonic

15GA PerfectSound Multimedia Monitor

See and hear the difference!™

- ◆ 15" (14" diagonal) viewable area
- ◆ Square CRT
- ◆ 27mm dot pitch
- ◆ Non-glare Super Contrast screen
- ◆ 1,280 x 1,024 maximum resolution
- ◆ 1,024 x 768 at 85Hz
- ◆ OnView™ on-screen menu controls
- ◆ High fidelity dome speakers built into bezel
- ◆ Microphone, headphone jack and external microphone port
- ◆ Plug and Play compatible (requires DDC-compatible video card)
- ◆ Swedish TC0 and MPR II compliant
- ◆ 3-year limited warranty



\$488.97 CDW 66333

CDW® sells for less and services you better!™

800-326-4CDW (4239)

If you don't see it, CALL!

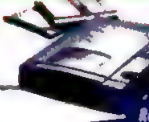
COMPUTER DISCOUNT WAREHOUSE™



WHY PAY RETAIL?

iomega Zip™ Drive

Endless capacity and complete mobility



Receive FREE copy with purchase of 6 Zip disks!

Technitron Series

The way colors are meant to be seen

- ◆ 15" Trinitron CRT, 14" viewable image (DX15T)
- ◆ 17" Trinitron CRT, 16.1" viewable image (DX17T)
- ◆ .25mm aperture grille pitch
- ◆ 1280 x 1024 maximum resolution
- ◆ Refresh rates up to 75Hz at 1024 x 768
- ◆ Plug and Play supports Windows® 95 and VESA's Display Data Channel
- ◆ 3-year limited warranty

DX15T	\$406 ⁹⁹	CDW 62089
DX17T	\$748 ⁹⁹	CDW 62091

CDW Sells For Less

- ◆ 100MB uncompressed/200MB compressed capacity on a single 3.5" Zip disk
- ◆ 29ms seek time, up to 1.4MB/second sustained transfer rate
- ◆ Parallel or SCSI interface (SCSI host adapter sold separately)
- ◆ Includes Zip Tools™ software
- ◆ Compact and portable: 1.5" x 5.35" x 7.25"
- ◆ 1 lb. • 1-year warranty on drive, limited lifetime warranty on disks

Parallel	\$199 ⁹⁹	CDW 51392
SCSI	\$199 ⁹⁹	CDW 51390
3.5" 100MB Zip disk	\$19 ⁹⁹	CDW 51396

* While supplies last

HARDWARE, SOFTWARE & PERIPHERALS AT DISCOUNT PRICES

NETWORKING PRODUCTS

NOVELL

5 User CD	564.22
10 User CD	1293.52
25 User CD	1885.46
100 User CD	3883.55

NetWare V4.1 upgrade

5 User to 5 User CD	262.72
5 User to 10 User CD	1004.55
5 User to 25 User CD	1634.00
10 User to 10 User CD	529.52
10 User to 25 User CD	1449.18
10 User to 50 User CD	1844.47
25 User to 25 User CD	794.84
25 User to 50 User CD	1476.14
25 User to 100 User CD	2524.76
50 User to 50 User CD	1317.63
50 User to 100 User CD	2107.56
100 User to 100 User CD	1843.81

NetWare V3.12

5 User 3.5"	619.21
10 User 3.5"	1364.16
25 User 3.5"	2003.61
50 User 3.5"	2796.05
100 User 3.5"	3883.55

Microsoft BackOffice

Microsoft Windows NT Network NT Value Pack	894.56
Windows NT Server CD	628.01
Single client license	34.26
20 client license pack	503.27

Microsoft SQL Server

SQL Server, CD	887.93
SQL Server upgrade, CD	445.72
Single client license	133.52
20 client license pack	2118.96

Microsoft Systems Mgmt Server

SMS Server, CD	583.18
SMS Server upgrade, CD	569.88
Single client license	48.14

Microsoft SNA Server

SNA Server CD	359.59
Single client license	78.73
20 client license pack	865.85

Microsoft Mail Server

Mail Server upgrade, CD	296.94
5 client license pack	239.45

3Com

3C509B Etherlink III coax	109.75
3C509B Etherlink III coax 10BT	103.89
3C509B Etherlink III 10BT S/pk	416.70
3C509B Etherlink III 10BT + AUJ	107.98
3C509B Etherlink III 10BT + AUJ S/pk	441.95
3C509B Etherlink III combo	122.07
3C509B Etherlink III combo S/pk	513.67
3C509B Etherlink III PCI 10BT	123.71
3C509B Etherlink III PCI combo	164.85
3C585 Fast Ethernet III PCI 10/100BT	161.91
3C16170 Linkbuilder TP12 port	119.36
3C18570 Linkbuilder FM12 port	511.66

Artisoft

NodeRunner/SII 2000A	84.98
NodeRunner/SII 2000T	71.80
NodeRunner Pro combo	78.45
T-Runner 8-port 10BT	164.43
T-Runner II 16-port 10BT	322.93
Simply LANtastic starter kit	163.79
LANtastic V6.0	73.34
LANtastic V6.0 5 user	304.88
LANtastic V6.0 Starter Kit, coax	225.50
LANtastic V6.0 add-on kit, coax	117.81
LANtastic V6.0 add-on kit, 10BT	117.93

LANtastic for Windows® 95 also available call CDW today for details

ASP

JetLANV Plus pocket adapter	212.28
Intelligent AutoSwitch, 2 comp to 1 printer	24.43
Intelligent AutoSwitch, 4 comp to 1 printer	35.94
SNAP starter kit 2 computers, 1 printer	109.80
SNAP add-on transmitter	41.92

Bay Networks

SynOptics System 800 10BT 8-port hub	204.00
SynOptics System 800M 10BT 8-port hub	536.60

IBM

Token Ring Auto Adapter 16/4 ISA	192.50
IBM Token Ring MAU	385.99

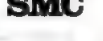
NETWORKING PRODUCTS



EtherExpress PRO-100Mbps PCI	144.65
EtherExpress PRO-100Mbps PCI S/pk	818.53
EtherExpress PRO-100Mbps EISA	211.92
EtherExpress PRO-10/10 Fast 10BT	106.60
EtherExpress 16/10BT S/pk	299.40
EtherExpress 16/10BT S/pk	458.76
EtherExpress MCA 10BT	166.94
EtherExpress 16 combo	119.20
EtherExpress 16 combo S/pk	542.71
EtherExpress EISA combo	402.82
EtherExpress Flash combo	131.64
EtherExpress Flash combo S/pk	592.28
TokenExpress Pro ISA LAN adapter	212.73
NetPortExpress EL Ethernet	173.30



Combo Ether16 LAN card	39.74
Combo EtherPCI LAN card	117.26
5-Port Workgroup Hub	76.78
8-Port Workgroup Hub	109.86



EtherE2 10BT	92.03
EtherE2 coax	91.61
EtherE2 combo	104.81
EtherPower 10/100BT PCI	146.65
EtherPower 10/100BT PCI S/pk	694.91
EtherPower 10BT PCI	12.86
EtherPower 10BT S/pk	506.67
EtherPower coax PCI	146.61
EtherPower coax PCI S/pk	685.62
TigerHub TP8 8 port + AUJ	165.15
TigerHub TP8 8 port + SMC	181.41
TigerHub TP12 12 port + AUJ	265.08
3008 Ethernet 8 port hub 10BT	288.21
3512 Ethernet 12+2 port hub 10BT	259.05
PC000VS ARCNET coax	122.61
ARCNET 8 port active hub coax	223.86
TokenCard Elite 16/4	211.74



Link MCS amber/green/white	269.97
Wyse 55 amber/green/white	254.45
Wyse 60 amber/green/white	136.54
Wyse 160 amber/green/white	184.31



PE3108C pocket Ethernet coax	104.12
PE3108C pocket Ethernet coax	266.01
PE3108T pocket Ethernet 10BT	263.81
PT316CTP pocket Token Ring III	448.10
PPX03 Parallel port multiplexor	76.66



Jumbo 350 internal	103.71
Jumbo 1400 internal	226.67
Trakker 350MB parallel port wipe	163.65
T1000C 800MB parallel port	189.68
T1000 800MB Travan wipe	161.24
PowerTape 2GB external wipe	108.98



Tape/Stor 800MB Travan internal	149.35
Tape/Stor 800MB Travan CD	246.51
Tape/Stor 850MB parallel	269.73
Tape/Stor 3200MB internal	253.46
Tape/Stor 4GB internal IDE	353.13



Zip drive 100MB parallel interface	179.00
Zip drive 100MB SCSI interface	199.00
Jaz drive 1GB external SCSI II interface	509.00
Jaz drive 1GB external SCSI II interface	499.00
Jaz drive one 1GB cartridge	124.00
Dotto Easy 800MB Travan tape drive external	149.00
Dotto Easy 800MB Travan tape drive internal	129.00

MICROSOLUTIONS

Backpack 3.5" 1.44MB floppy parallel	151.21
Backpack 800TD 800MB Travan parallel	158.29

EXABYTE

EXB-8700 8MM	168.55
EXB-8805XL 7GB tape backup internal	178.29



EZ135 135MB internal IDE interface	194.85
EZ135 135MB external SCSI interface	199.99
EZ135 135MB cartridge	231.11
EZ135 135MB external parallel interface	245.32

MULTIMEDIA AND CD

Discovery CD 4x PnP multimedia kit	273.48
Blaster CD 4x kit	125.69
Sound Blaster Vx4 CD 4x kit	233.88
Sound Blaster 16/30 value edition (IDE)	94.63
Sound Blaster AWE32 PnP	277.61

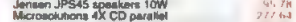
AES VEGA to TV Elite internal

AES VEGA to TV Elite internal	129.99
ALPS 4X internal CD-ROM changer	307.01
Advent PP570 speakers 35W	245.18
Advent PP570 speakers 25W	112.42
Advent PP170 speakers 5W	64.56
Advent PP622 speakers/subwoofer	185.61
Altec Lansing ACS500 surround system	347.15
Connectix QuickCam for Windows	98.05
Diamond Multimedia Kit ULTRA 8X CD	411.81
Diamond Multimedia Kit 4400 4X CD int	286.26
Jensen JPS35 speakers SW	97.26
Jensen JPS45 speakers 10W	95.78
Microsolutions 4X CD parallel	277.64
Microsolutions 4X CD parallel w/sound	278.61
Mnolta Snappy video still capture	195.98
NEC 6X	235.65
NEC 8X	243.82
NEC 4X, 4X, 4X 4 disc changer	347.15
NEC 4X, 4X, 4X 4 disc changer	277.20
Pioneer DPM624X 4X, 6 disc changer	294.91
Plaster 8X internal	134.42
Sony PRD-150 portable PC/MCIA Diagnostics	247.66
Sony 4X internal WDC interface	106.84
Sony 4X internal WDC SCSI 2 interface	158.00
SurfMonStar 8X portable CD-ROM drive	258.37
SurfMonStar 8X internal CD-ROM drive	179.11
Toshiba 3701B SCSI 6.7X internal	251.51
Turtle Beach TSP3 Plus 32	419.11
Turtle Beach TBS 3001 4X 3 speed	187.80
Yamaha YST M-15 speakers	89.63
Yamaha YST M-15 speakers & subwoofer	189.86

INPUT DEVICES

ALPS

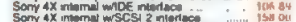
Desktop Glidepoint	65.87
GlidePoint Windows 95 keyboard	94.11



Drawing Slate II 4x5 pressure pen	128.25
Drawing Slate II 6x9 pressure pen	196.98
Drawing Slate II 12X12 4 button cordless	219.19

EPSON

PhotoPC digital camera	199.00
Action/Scanning System II	329.87
EIS 1000C	227.17
EIS-1200ProPC	1126.16



HP ScanJet 4S	811.12
PageScan Color 4S	846.17
HP ScanJet 4C document feeder	153.97

LOGITECH

MouseMan 96	53.49
TrackMan Color Scanner	267.54
TrackMan Marble	85.11
TrackMan Live! cordless pointer	118.35

KODAK

DC40 Digital Science Camera	499.00
DC50 Digital Science Camera	999.00

MICROTEK

ScanMaker E3 color flatbed	375.24
ScanMaker E6 color flatbed	596.49
ScanMaker II color flatbed	197.57
ScanMaker 35T slide scanner	644.46

INPUT DEVICES

UMAX

Vista-56 PCPro	651.73
Vista-56 PCLE2	561.31
Vista-S12 PCPro2	841.13
Powerlook II PCPro2	2706.78



PaperPort VX

Mag Innovation DX1495 PnP 14"	282.13
Mag Innovation DX1595 PnP 15"	374.14
Mag Innovation DX1795 PnP 17"	854.40
Mag Innovation MXP17F	629.49
Mag Innovation DX17T 17"	744.99
Mag Innovation MXP21F	1484.25
Mag Innovation MXP21F 14"	235.51
Mag Innovation MXP21F 15"	252.29
Mag Innovation MXP21F 16"	337.18
Mag Innovation MXP21F 17"	389.77
Mag Innovation MXP21F 18"	536.08
Mag Innovation MXP21F 20"	1013.19
Mag Innovation MXP21F 20"	1278.17
NEC XV15 15"	473.13
NEC XV17 17"	799.84
NEC XV21 21"	1659.55
NEC XV21 21"	1059.89
NEC XV21 21"	1919.54
Samsung 15GLU 15"	423.09
Samsung 17GLU 17"	749.00
Sony 1551F 15" PnP	484.00
Sony 155X 15" PnP	428.41
Sony 1751F 17" PnP	1075.61
Sony 1751F 17" PnP	811.60
Sony Multiscan 20dell PnP	1666.22
ViewSonic 15G5 15"	405.80
ViewSonic 17G5 17"	561.18
ViewSonic Optiquest 7775	785.64
ViewSonic 21P5 21"	1578.72

VIDE CARDS

ATI Graphics Xpression ISA 2MB	131.18
ATI Graphics Xpression ISA 1MB	105.24
ATI Graphics Xpression VLS 2MB	127.14
ATI Graphics Xpression PCI 2MB	132.18
ATI Graphics Pro Turbo ISA 2MB	262.02
ATI Graphics Pro Turbo VLS 2MB	235.80
ATI Graphics Pro Turbo PCI 2MB	262.02
ATI Graphics Pro Turbo PCI 4MB	399.37
Diamond SpeedStar Pro ISA 1MB	93.88
Diamond SpeedStar Video VLS 2MB	207.89
Diamond Edge 2120XL 1MB DRAM	213.34
Diamond Edge 2200XL 2MB DRAM	275.33
Diamond Edge 3240XL 2MB VRAM	374.37
Diamond Edge 3400XL 4MB VRAM	522.01
Intel Smart Video Recorder Pro	402.82
Matrox Millennium PCI 2MB VRAM	314.51
Matrox Millennium PCI 4MB VRAM	456.92

OVERDRIVE PROCESSORS

intel

Intel OverDrive DX2/50	115.54
Intel OverDrive DX2/66	129.40
Intel OverDrive DX4/75	138.66
Intel OverDrive DX4/100	178.74
Intel OverDrive Pentium 63MHz	142.87
Intel OverDrive Pentium 66MHz	189.27
Intel OverDrive Pentium 120/133MHz up to 580, 566	339.11
Intel OverDrive Pentium 120/133MHz up to 575	339.11
Intel OverDrive Pentium 150MHz up to 590	413.84
Intel OverDrive Pentium 166MHz up to 5-100	556.70

MEMORY UPGRADES

intel

EtherExpress PRO/100

100Mbps Fast Ethernet adapters

Intel's EtherExpress[®] PRO/100 adapters are the easiest way to migrate to Fast Ethernet networking. PRO/100 adapters integrate easily into your existing Ethernet environment to deliver these powerful advantages:

- High-performance 32-bit architecture
- Seamless migration from 10 to 100Mbps with one driver, one connector and hub speed auto-sensing
- Proven Ethernet technology
- One-step installation
- Limited lifetime warranty

PCI	\$144 ^{MM}	CDW 56239
PCI, 8 pack	\$838 ^{MM}	CDW 56240
EISA	\$241 ^{MM}	CDW 47330
Workgroup bundle	\$1879 ^{MM}	CDW 56257



WHY SETTLE FOR LESS?

CDW[®] SERVICES YOU BETTER!

MICROTEK

Better Images Through Innovation

ScanMaker E6

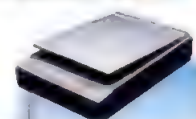
- 30-bit, high-resolution color scanner
- 600 x 1200 dpi optical resolution, 4800 x 4800 dpi maximum
- Fast, single-pass scanning
- Legal-sized scanning area
- Includes imaging software, OmniPage LTD OCR, ScanWizard, SCSI card and cable

E6 Standard with ImageStar II

\$556^{MM} CDW 66672

E6 Pro with Photoshop V3.05 (CD)

\$738^{MM} CDW 66671



ScanMaker E3

- 24-bit color
- 300 x 600 dpi optical resolution
- Single-pass scanning
- Includes ImageStar II, OmniPage LTD OCR, ScanWizard, SCSI card and cable

\$375^{MM} CDW 63623

CDW[®] CARRIES OVER 20,000 PRODUCTS. IF YOU DON'T SEE IT, CALL!

COMPUTERS

TOSHIBA

100CS 5/75 8MB 500MB pas color	1839.88
T2130CS DX4/75 500MB pas color	1579.53
Portege 510CT 5/90 720MB act color	3889.99
4100CT 5/90 8MB 720MB act color	3135.97
Tecra 700CS 5/120 16MB 1.2GB pas color	4319.52
Tecra 700CS 5/120 16MB 1.2GB act color	4481.43
Tecra 700CT 5/130 16MB 1.2GB act color	4831.49
Tecra 720CT 5/130 16MB 1.2GB act color	4796.87
Tecra 720CT 5/130 16MB 1.2GB act color	4729.92

AST

Ascendia J10 5/75 8MB 800MB dual scan	2126.63
Ascendia J30 5/100 8MB 800MB dual scan	2629.22
Ascendia J30 5/100 8MB 800MB act color	2808.58
Ascendia P30 5/100 8MB 800MB dual scan	2929.99
Ascendia P30 5/100 8MB 1.2GB dual scan	3754.13
Ascendia P50 5/133 8MB 1.2GB active color	4221.60
Ascendia P50 5/133 8MB 1.2GB active color	4485.56

Advantage desktops

824-5/100 16MB 1.2GB 14.4K bps 6XCD	1973.73
825-5/123 16MB 1.2GB 14.4K bps 6XCD	2095.43
828-5/150 16MB 1.6GB 14.4K bps 6XCD	2284.55
822-5/100 16MB 1.6GB 28.8K bps 6XCD	1973.73
824-5/133 16MB 1.6GB 28.8K bps 6XCD	2239.36
828-5/150 16MB 1.6GB 28.8K bps 6XCD	2569.57
828-5/150 16MB 1.6GB 28.8K bps 6XCD	2759.57

COMPAQ

COMPAQ PORTABLES

LTE 5000 5/75 8MB 510MB dual scan	2879.37
LTE 5000 5/75 8MB 810MB dual scan	3204.57
LTE 5000 5/75 8MB 810MB act color	3648.77
LTE 5100 5/90 8MB 810MB act color	4032.97
LTE 5100 5/90 8MB 810MB act color CD	4417.17
LTE 5200 5/120 8MB 1.35GB act color	4801.37

ProLine Series

ProLine 5100 5/75 8MB 510MB dual scan	2879.37
ProLine 5100 5/75 8MB 810MB dual scan	3204.57
ProLine 5100 5/75 8MB 810MB act color	3648.77
ProLine 5100 5/90 8MB 810MB act color	4032.97
ProLine 5100 5/90 8MB 810MB act color CD	4417.17
ProLine 5200 5/120 8MB 1.35GB act color	4801.37

ProLine Series Mini Towers

ProLine 5100 MT 5/133 16MB 2GB	3186.60
ProLine 5150 MT 5/150 16MB 2GB	3283.65
ProLine 5166 MT 5/166 16MB 2GB	3505.65

Desktop Series Desktops

Desktop 575 5/75 8MB 540MB	1866.75
Desktop 5100 5/100 8MB 840MB	1802.35
Desktop 5100 5/100 16MB 1.2GB	2237.40
Desktop 5120 5/120 16MB 1.2GB	2361.70
Desktop 5133 5/133 16MB 1.2GB	2551.20
Desktop 5133 5/133 16MB 1.2GB	2715.00
Desktop 5133 5/133 16MB 2GB	2689.40
Desktop 5133 5/133 16MB 2GB	2929.60
Desktop 5150 5/150 16MB 1.2GB	2889.20
Desktop 5150 5/150 16MB 2GB	3028.40
Desktop 5150 5/150 16MB 2GB	3395.65
Desktop 5166 5/166 16MB 1.2GB	3095.20
Desktop 5166 5/166 16MB 2GB	3621.65
Desktop 5166 5/166 16MB 2GB	3435.20

HEWLETT PACKARD

OmniBook Portables

HP OmniBook 600C 4/75 4MB 340MB act scan	2194.84
HP OmniBook 600CT 4/75 4MB 340MB act scan	2496.61
HP OmniBook 5000CT 5/90 8MB 1.2GB act color	5055.54
HP OmniBook 5000CT 5/120 16MB 1.2GB act color	6015.06
HP OmniBook 5000CT 5/120 16MB 1.2GB act color	5499.66
HP OmniBook 5000CT 5/120 16MB 1.2GB act color	6072.87

NEC

Versa V 450 4MB 340MB act	1209.00
Versa V 475 4MB 340MB act	1499.00
Versa 550D Cymx 5/100 8MB 540MB dual scan	1799.00
Versa 2200C 5/75 8MB 810MB act color	2440.00
Versa 2200C 5/75 8MB 810MB act color mod	2499.00
Versa 4000 5/75 8MB 810MB CD	3799.00
Versa 4000 5/90 8MB 810MB act color	4499.00
Versa 4000 5/90 8MB 810MB act color	4499.00
Versa 4000 5/120 8MB 1GB act color	4999.00

COMPUTERS

IBM

ThinkPad portables

780C 5/90 8MB 720MB 12.1 act color Selecta	5499.00
780C 5/120 8MB 720MB 12.1 act color Selecta	5499.00
780C 5/90 8MB 720MB 10.4 act color WIN95	4999.00
780C 5/120 8MB 720MB 12.1 act color WIN95	5999.00
780C 5/120 8MB 1GB 12.1 act color Selecta	5999.00
780C 5/120 8MB 1GB 12.1 act color WIN95	5999.00
780C 5/90 8MB 1.2GB 12.1 act color Selecta	6499.00
780C 5/120 8MB 1.2GB 12.1 act color WIN95	6999.00
780C 5/120 8MB 1.2GB 12.1 act color Selecta	6499.00
780C 5/120 8MB 1.2GB 12.1 act color WIN95	6999.00

Call for pricing on the latest ThinkPad models.

PC300 Series desktops

PC300 5/90 16MB 850MB 3 bays	1889.80
PC300 5/100 16MB 850MB 3 bays	2069.00
PC300 5/133 16MB 850MB 3 bays	2299.00
PC300 5/166 16MB 1.2GB 3 bays	2959.00
PC300 5/75 16MB 850MB 5 bays	1969.00
PC300 5/100 16MB 850MB 5 bays	2129.00
PC300 5/133 16MB 850MB 5 bays	2359.00
PC300 5/133 16MB 1.2GB 5 bays	2499.00
PC300 5/166 16MB 1.2GB 5 bays	3019.00

PC700 Series desktops

PC700 5/100 16MB 1GB 5 bays Selecta	2829.00
PC700 5/133 16MB 1GB 5 bays Selecta	3479.00

CONSUMABLES

SEMS 410 100 16MB 1.2GB 14.4K bps 6XCD	2879.37
SEMS 410 100 16MB 1.2GB 14.4K bps 6XCD	3204.57
SEMS 410 100 16MB 1.2GB 14.4K bps 6XCD	3648.77
SEMS 410 100 16MB 1.2GB 14.4K bps 6XCD	4032.97
SEMS 410 100 16MB 1.2GB 14.4K bps 6XCD	4417.17
SEMS 410 100 16MB 1.2GB 14.4K bps 6XCD	4801.37

TEXAS INSTRUMENTS

Extensa 5600C 5/75 8MB 810MB dual color	2701.43
Extensa 5600CT 5/75 8MB 1.2GB act color	3657.42
Extensa 5600C 5/75 8MB 810MB act color	2919.34
Extensa 5600C 5/75 8MB 810MB act color	3369.03
Extensa 5600C 5/75 8MB 810MB act color	4614.10
Extensa 5600C 5/75 8MB 810MB act color	5208.45

PRINTERS

OKIDATA

184 Turbo	228.28	ML591	603.67
ML320	315.50	Placemaster 3410	2051.42
ML321	445.15	OL600	399.00
ML380	222.74	OL610/PS	699.46
ML395	1005.83	OL810E	755.42
ML520	379.78	OL200	1099.72
ML521	409.07	OKIJET 2010	329.48
ML580	545.72		

Canon

BJ30 mono	265.50	BJC210	469.00
BJC70 color	359.79	BJC4100	329.00
BJC210	239.00		

EPSON

LX300	165.41	DFX5000 Plus	1385.48
LQ570+	246.25	DFX9000	2333.16
LQ670	481.03	Stylus Color Ii	268.65
LQ1070+	383.04	Stylus Color Ii	299.00
LQ1170	689.85	Stylus Color Pro	499.00
LQ1270	595.00	Stylus 1500	995.00
FX870	789.45	Stylus Pro XL	1799.00
FX1170	376.56		
FX2170	499.00		

LEXMARK LASER PRINTERS

Color JetPrinter 1020	203.68
WinWriter 1500: thermal inkjet	274.95
Color JetPrinter 2070	396.65
4030 10 Plus 10ppm	542.17
Optima R Plus 16ppm	1079.20
Optima R Plus 16ppm 2 paper trays	1385.80
Optima LX Plus 16ppm	1815.17
Optima LX Plus 16ppm	1922.73
Optima C color laser	2591.62
	5913.75

Panasonic

1150	133.81	3121	256.81
2023	182.70	KX-P5100 Laser	398.42
2130	204.29	KX-P6500 Laser	446.69
2135 Color	247.53		

PRINTERS

TEXAS INSTRUMENTS

microLaser 600	895.69
microLaser Pro E	1207.77
microLaser PowerPro/12	1362.91
microLaser Pro 6	1111.05

HEWLETT PACKARD

HP DeskJet 340 portable	206.69
HP DeskJet 600	199.97
HP DeskJet 600C	241.01
HP DeskJet 660C	349.41
HP LaserJet 5L	479.00
HP OfficeJet inkjet fax/copier/printer	494.94
HP OfficeJet LX inkjet fax/copier/printer	595.84

COSTAR

LabelWriter XL WIN	144.42
LabelWriter XL Plus WIN	218.81

HARD DRIVES & CONTROLLERS

Mappr

540MB EIDE	176.05
1.2GB EIDE	239.79
1.6GB Fast-ATA	275.33

CONNER

540MB EIDE	175.23	1.06 Fast SCSI-2	289.66
850MB Fast-ATA	198.71	2.14GB Fast SCSI-2	2619.49
1.06MB EIDE	228.37	4.29GB Fast SCSI-2	2961.74

Seagate

545MB Fast-ATA	181.93
831MB Fast-ATA	184.57
1.05GB FW SCSI-2	161.21
1.6GB Fast-ATA	205.29
1.06GB Fast SCSI-2	256.32
2.1GB Fast ATA-2	228.33
2.1GB Fast ATA-2	383.33
2.1GB Fast SCSI-2	713.09
2.14GB FW SCSI-2	817.82
4.29GB Fast SCSI-2	864.12
9GB Fast SCSI-2	2044.42

WESTERN DIGITAL

Cavarr 635MB IDE	191.31
Cavarr 635MB EIDE	201.29
Cavarr 1.2GB EIDE	222.81
Cavarr 1.6GB EIDE	222.81
Cavarr 1.6GB EIDE	292.62

CONTROLLERS

Accugic SIDE-3+ won-board BIOS	37.18
Accugic SIDE-4+ w/2er 2ser game	27.74
Accugic SIDE-4V1 EIDE 16550 serial	68.24
Adaptec 1542-CP SCSI Master Kit	255.34
Adaptec Power Storage ISA Kit	609.46
Adaptec Power Storage PCI Kit	609.46
Adaptec AVA1505 SCSI 2 CD Kit	48.32
Adaptec 2842 VLB SCSI Kit	230.11
Adaptec PCI Ultra Wide SCSI Kit	301.81
Promise 2300+ EIDE VLB	40.57

MODEMS & COMMUNICATIONS

BOCA

Online Express 14.4 internal w/fax	46.82
Online Express 14.4 external w/fax	67.87
V.34 28.8 internal w/fax	147.46
V.34 28.8 external w/fax	209.64

Hayes

ACCURA 144 internal w/fax	79.05
ACCURA 144 external w/fax	94.51
ACCURA 288 V.34 internal w/fax	168.17
ACCURA 288 V.34 external w/fax	176.43
OPTIMA 144 external w/fax	37.72
OPTIMA 288 V.34 internal w/fax	359.58
OPTIMA 288 Business Modem	425.70

MICROCOM

DeskPorte Fast EIS V.34 28.8	189.52
DeskPorte 28.8P V.34	235.35

MOTOROLA

14.4 VoiceSURFR internal	75.98
14.4 VoiceSURFR external	112.86
V.34 ModemSURFR internal	184.76
V.34 ModemSURFR external	184.76
OnlineSURFR V.34 Package internal	179.60
OnlineSURFR V.34 Package external	179.60
BrSURFR SDN adapter internal	263.97
BrSURFR SDN adapter external	263.97
BrSURFR SDN adapter	263.97

NEC GIVES YOU THE BEST IN QUALITY, SPEED AND CONVENIENCE. (AND NOW A FEW WORDS ABOUT OUR PRODUCTS.)



NEC READY 7612*

\$1,999

OR LEASE
FROM \$42/MONTH

- Intel Pentium® 133MHz
- 1.2GB IDE HDD
- 8MB RAM, expandable to 128MB
- 64-bit PCI local bus graphics controller
- 16-bit 3-D Surround Sound 7W Speakers

- 28.8Kbps fax/data modem, handsfree speakerphone
- Integrated 6X CD-ROM drive
- IrDA Infra-Red data transfer capability
- Microsoft® Windows® 95 & multimedia software suite
- Three-year limited warranty with first year on-site

MULTIMEDIA SHOWCASE*

NEC Ready Systems are perfect for your family or small office and offer the ultimate in multimedia features including: quad speed CD-ROM reader, 28.8 Kbps fax/modem, 64-bit PCI graphics, 16-bit stereo sound, speakerphone with voicemail and a multimedia software suite of over 20 titles.

Model	Processor	HD	Memory	Price
Ready 9610	Pentium 120MHz	1.6GB	16MB RAM	\$2,100
Ready 7614	Pentium 150MHz	1.2GB	8MB RAM	\$2,250
Ready 9617	Pentium 133MHz	1.6GB	16MB RAM	\$2,300
Ready 9618	Pentium 150MHz	2.0GB	16MB RAM	\$2,700
Ready 9619	Pentium 166MHz	2.0GB	16MB RAM	\$2,900

THE ULTIMATE ENTERPRISE PC WORKSTATION*

PowerMate P166

- Minitor unit (MT-1650-24853C)
- 166MHz Pentium® Processor

- 2GB EIDE HDD
- 16MB RAM

- 6X CD-ROM Reader
- 82-bit sound

**NEC
POWERMATE®
P166**

\$3,099

OR LEASE FROM
\$76/MONTH

The perfect choice for corporate computing, NEC PowerMate Systems are some of the fastest most reliable systems available. Multimedia versions available with 6X speed CD-ROM readers and sound. Also available:

Model	Processor	HD	Memory	Price
PowerMate V75	Pentium 75MHz	850MB	8MB RAM	\$1,300
PowerMate V100	Pentium 100MHz	850MB	8MB RAM	\$1,540
PowerMate P120	Pentium 120MHz	1.2GB	16MB RAM	\$2,000
PowerMate P133	Pentium 133MHz	1.2GB	16MB RAM	\$2,200
PowerMate P150	Pentium 150MHz	1.8GB	16MB RAM	\$2,400

*Monitors not included in price.

PowerMate, MultiSync, MultiSpin, 4x4, VersaGlide, VersaBay II, CD2, CD3, 2V, 3V, and See, Hear and Feel the Difference are service marks, trademarks, or registered trademarks of NEC Corporation and its affiliates, trademark of Creative Labs, Inc. All other trademarks, registered marks, and service marks are property of their respective owners. The Energy Star emblem does not represent EPA endorsement of any product or service, subject to change. ©1995 NEC Technologies, Inc.

NEC VERSA 4000
\$4,499
OR LEASE FROM
\$123/MONTH



MULTIMEDIA TO GO

The new NEC Versa[®] 4000 brings you the next generation in notebook versatility with its innovative VersaBay II[™] technology. You can configure it at a moment's notice with an optional CD-ROM reader; additional battery or hard drive.

NEC Versa 4000

- 6MB RAM standard (upgradable to 40MB)
- Sound Blaster[™] Pro Compatible 16-Bit Audio w/ Two Built-In Speakers
- Supports Full-Motion Video via Intel Inside[®]
- Choice of Windows[®] for Workgroups 3.11 or Microsoft[®] Windows 95
- Removable Lithium Ion Battery
- 2 PC Card Slots
- VersaSlide[™] Pointing Device with Palm Rest

Model	Processor	Screen	HD/CD-ROM	Price
PC-6100-11002D	Pentium 75MHz	10.1" TFT	610MB 4X	\$3,799
PC-6110-11002D	Pentium 90MHz	10.1" TFT	610MB 4X	\$4,499
PC-6110-71002	Pentium 90MHz	10.4" Hi-Res TFT	610MB RAM	\$4,499
PC-6120-71702	Pentium 120MHz	10.4" Hi-Res	1GB	\$4,999

A SMART VALUE FOR PENTIUM PERFORMANCE

The NEC Versa 2200's state-of-the-art intelligent design provides you with one of the best values in notebook computing.

NEC Versa 2200

- 75MHz Pentium[®] Processor
- 6MB RAM standard (upgradable to 40MB)
- 610MB HDD
- 8.5" Active Matrix Color
- 2 PC Card Slots
- VersaSlide[™] Pointing Device with Palm Rest
- Removable Lithium Ion Battery

Model	Description	Modem	Price
PC-6020-1602W	Versa 2200C	Optional	\$2,449
PC-6020-1602MX	Versa 2200C	14.4 Kbps	\$2,499

THE BEST IN THE VALUE CLASS

Feature for feature, no other notebook in its class can match the new NEC Versa 5500. This notebook is powered by a Cyrix 5x86[™] 100MHz processor with 16KB cache. While providing lightning performance, this chip consumes less than 3.5 watts of power to maximize battery life.

Model	Screen	HD/Memory	Price
PC-6300-4540	10.4" DSTN Color	540MB/2MB RAM	\$1,799

NEC MULTISPIN[®]: THE CUTTING EDGE IN CD-ROM READERS

Model	Data Transfer Rate	Access Time	Price
MultiSpin GXi (internal)	900 KB/sec	145ms	\$349
MultiSpin GXe (external)	900 KB/sec	145ms	\$499
MultiSpin GV	900 KB/sec	145ms	\$179
MultiSpin 4VIDE	600 KB/sec	200ms	\$159
MultiSpin 4Xc 7 Disc Changer	800 KB/sec	350ms	\$349
MultiSpin 4x4 [™] CD-ROM Changer	300KB/sec	380ms	\$279



NEC MULTISYNC[®] MONITORS: A CLEAR ADVANTAGE AT WORK OR PLAY

Model	Screen	DPI	Max Resolution	Price
MultiSync C400	14" diagonal CRT	28mm	1024 x 768 HI	\$ 299
MultiSync M500	15" diagonal CRT	28mm	1280 x 1024 HI	\$ 599
MultiSync XY15+	15" diagonal flat square CRT	28mm	1280 x 1024 HI	\$ 499
MultiSync C500	15" diagonal CRT	28mm	1024 x 768 HI	\$ 399
MultiSync XY17+	17" diagonal flat square CRT	28mm	1280 x 1024 HI	\$ 819
MultiSync XE21	21" diagonal flat square CRT	28mm	1024 x 768 HI	\$1,849
MultiSync M700	17" diagonal CRT	28mm	1280 x 1024 HI	\$ 899



NEC SUPERScript[™]
COLOR 3000 AT
A NEW LOW PRICE:
\$399

NEC SUPERScript[™]: POWERFUL PRINTING POSSIBILITIES

Model	Resolution	PPM	Price
SuperScript C3000	300 dpi Max Thermal Transfer; 300 dpi Variable Dot Thermal; 300 dpi Dye Sublimation	N/A	\$399
SuperScript 660i	600 dpi	6ppm	\$599
SuperScript 660	600 dpi	6ppm	\$499
SuperScript 610 Plus	300 dpi	6ppm	\$399

NEC SELECT DELIVERS IT ALL TO YOU.

Now you can order virtually any product directly from NEC. Our professional sales team will assist you in selecting the NEC products that best fit your individual or corporate needs. To receive a complete copy of our NEC Select Price List via your fax machine, call our FastFacts[™] service at 1-800-366-0476 and request catalog #8, or look for us at our new web site at <http://www.nec.com>. Remember, we're only a toll-free call away, weekdays between 8:30 AM and 8:00 PM (EST). Call 1-800-615-5566 and experience the difference NEC Select makes.

- Free FedEx[®] Economy Two-Day[™] Service^{*}
- Three Year Limited Warranty (except where noted)
- 30-day Money Back Guarantee
- 7-Day x 24 Hour Technical Support
- Flexible Payment Options

CALL 1-800-615-5566

Key #20643



SEE, HEAR AND FEEL THE DIFFERENCE.[™]

**NEC
SELECT**

Versa is a US registered trademark of NEC Technologies, Inc. The Intel Inside logo, Pentium and Indeo are registered trademarks of Intel Corp. Windows 95 is a registered trademark of Microsoft Corp. Sound Blaster is a registered trademark of Creative Technology Ltd. Prices subject to change without notice. Quantities may be limited. *FedEx 2nd day delivery available on in-stock items only. Leasing arranged by Lease Acceptance Corporation, based on 60 month fair market lease option.

CIRCLE 217 ON READER SERVICE CARD

NEW HP DeskJet 820Cxi Printer Professional Series

Only \$379

• 600x600dpi black
• 600x300dpi color
• Prints up to 6.5 ppm in black (up to 4 ppm in color)
• HP's RealLife Imaging System
• Paper types include business cards, labels, and transparencies
• One year warranty
• HP ColorSmart technology for effortless results

HP DeskJet 1600C Printer

Only \$1299

Out of Ink Sensor. MET (Memory Enhancement Technology)

- 600x600 dpi black best
- 300 dpi color
- 9 ppm for text
- 32-bit RISC Processor
- 4MB Memory (Max. 100 MB)
- Expandable & networkable

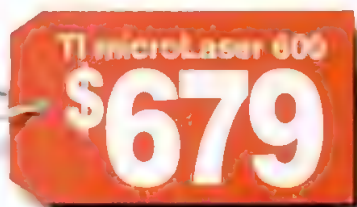
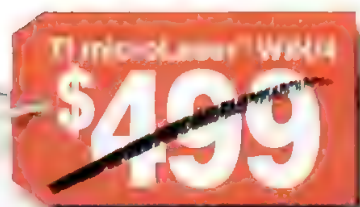
Also Available: HP DeskJet 1600C Plus (Optional: 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st, 32nd, 33rd, 34th, 35th, 36th, 37th, 38th, 39th, 40th, 41st, 42nd, 43rd, 44th, 45th, 46th, 47th, 48th, 49th, 50th, 51st, 52nd, 53rd, 54th, 55th, 56th, 57th, 58th, 59th, 60th, 61st, 62nd, 63rd, 64th, 65th, 66th, 67th, 68th, 69th, 70th, 71st, 72nd, 73rd, 74th, 75th, 76th, 77th, 78th, 79th, 80th, 81st, 82nd, 83rd, 84th, 85th, 86th, 87th, 88th, 89th, 90th, 91st, 92nd, 93rd, 94th, 95th, 96th, 97th, 98th, 99th, 100th, 101st, 102nd, 103rd, 104th, 105th, 106th, 107th, 108th, 109th, 110th, 111th, 112th, 113th, 114th, 115th, 116th, 117th, 118th, 119th, 120th, 121st, 122nd, 123rd, 124th, 125th, 126th, 127th, 128th, 129th, 130th, 131st, 132nd, 133rd, 134th, 135th, 136th, 137th, 138th, 139th, 140th, 141st, 142nd, 143rd, 144th, 145th, 146th, 147th, 148th, 149th, 150th, 151st, 152nd, 153rd, 154th, 155th, 156th, 157th, 158th, 159th, 160th, 161st, 162nd, 163rd, 164th, 165th, 166th, 167th, 168th, 169th, 170th, 171st, 172nd, 173rd, 174th, 175th, 176th, 177th, 178th, 179th, 180th, 181st, 182nd, 183rd, 184th, 185th, 186th, 187th, 188th, 189th, 190th, 191st, 192nd, 193rd, 194th, 195th, 196th, 197th, 198th, 199th, 200th, 201st, 202nd, 203rd, 204th, 205th, 206th, 207th, 208th, 209th, 210th, 211st, 212nd, 213th, 214th, 215th, 216th, 217th, 218th, 219th, 220th, 221st, 222nd, 223rd, 224th, 225th, 226th, 227th, 228th, 229th, 230th, 231st, 232nd, 233rd, 234th, 235th, 236th, 237th, 238th, 239th, 240th, 241st, 242nd, 243rd, 244th, 245th, 246th, 247th, 248th, 249th, 250th, 251st, 252nd, 253rd, 254th, 255th, 256th, 257th, 258th, 259th, 260th, 261st, 262nd, 263rd, 264th, 265th, 266th, 267th, 268th, 269th, 270th, 271st, 272nd, 273rd, 274th, 275th, 276th, 277th, 278th, 279th, 280th, 281st, 282nd, 283rd, 284th, 285th, 286th, 287th, 288th, 289th, 290th, 291st, 292nd, 293rd, 294th, 295th, 296th, 297th, 298th, 299th, 300th, 301st, 302nd, 303rd, 304th, 305th, 306th, 307th, 308th, 309th, 310th, 311st, 312nd, 313th, 314th, 315th, 316th, 317th, 318th, 319th, 320th, 321st, 322nd, 323rd, 324th, 325th, 326th, 327th, 328th, 329th, 330th, 331st, 332nd, 333rd, 334th, 335th, 336th, 337th, 338th, 339th, 340th, 341st, 342nd, 343rd, 344th, 345th, 346th, 347th, 348th, 349th, 350th, 351st, 352nd, 353rd, 354th, 355th, 356th, 357th, 358th, 359th, 360th, 361st, 362nd, 363rd, 364th, 365th, 366th, 367th, 368th, 369th, 370th, 371st, 372nd, 373rd, 374th, 375th, 376th, 377th, 378th, 379th, 380th, 381st, 382nd, 383rd, 384th, 385th, 386th, 387th, 388th, 389th, 390th, 391st, 392nd, 393rd, 394th, 395th, 396th, 397th, 398th, 399th, 400th, 401st, 402nd, 403rd, 404th, 405th, 406th, 407th, 408th, 409th, 410th, 411st, 412nd, 413th, 414th, 415th, 416th, 417th, 418th, 419th, 420th, 421st, 422nd, 423rd, 424th, 425th, 426th, 427th, 428th, 429th, 430th, 431st, 432nd, 433rd, 434th, 435th, 436th, 437th, 438th, 439th, 440th, 441st, 442nd, 443rd, 444th, 445th, 446th, 447th, 448th, 449th, 450th, 451st, 452nd, 453rd, 454th, 455th, 456th, 457th, 458th, 459th, 460th, 461st, 462nd, 463rd, 464th, 465th, 466th, 467th, 468th, 469th, 470th, 471st, 472nd, 473rd, 474th, 475th, 476th, 477th, 478th, 479th, 480th, 481st, 482nd, 483rd, 484th, 485th, 486th, 487th, 488th, 489th, 490th, 491st, 492nd, 493rd, 494th, 495th, 496th, 497th, 498th, 499th, 500th, 501st, 502nd, 503rd, 504th, 505th, 506th, 507th, 508th, 509th, 510th, 511st, 512nd, 513th, 514th, 515th, 516th, 517th, 518th, 519th, 520th, 521st, 522nd, 523rd, 524th, 525th, 526th, 527th, 528th, 529th, 530th, 531st, 532nd, 533rd, 534th, 535th, 536th, 537th, 538th, 539th, 540th, 541st, 542nd, 543rd, 544th, 545th, 546th, 547th, 548th, 549th, 550th, 551st, 552nd, 553rd, 554th, 555th, 556th, 557th, 558th, 559th, 560th, 561st, 562nd, 563rd, 564th, 565th, 566th, 567th, 568th, 569th, 570th, 571st, 572nd, 573rd, 574th, 575th, 576th, 577th, 578th, 579th, 580th, 581st, 582nd, 583rd, 584th, 585th, 586th, 587th, 588th, 589th, 590th, 591st, 592nd, 593rd, 594th, 595th, 596th, 597th, 598th, 599th, 600th, 601st, 602nd, 603rd, 604th, 605th, 606th, 607th, 608th, 609th, 610th, 611st, 612nd, 613th, 614th, 615th, 616th, 617th, 618th, 619th, 620th, 621st, 622nd, 623rd, 624th, 625th, 626th, 627th, 628th, 629th, 630th, 631st, 632nd, 633rd, 634th, 635th, 636th, 637th, 638th, 639th, 640th, 641st, 642nd, 643rd, 644th, 645th, 646th, 647th, 648th, 649th, 650th, 651st, 652nd, 653rd, 654th, 655th, 656th, 657th, 658th, 659th, 660th, 661st, 662nd, 663rd, 664th, 665th, 666th, 667th, 668th, 669th, 670th, 671st, 672nd, 673rd, 674th, 675th, 676th, 677th, 678th, 679th, 680th, 681st, 682nd, 683rd, 684th, 685th, 686th, 687th, 688th, 689th, 690th, 691st, 692nd, 693rd, 694th, 695th, 696th, 697th, 698th, 699th, 700th, 701st, 702nd, 703rd, 704th, 705th, 706th, 707th, 708th, 709th, 710th, 711st, 712nd, 713th, 714th, 715th, 716th, 717th, 718th, 719th, 720th, 721st, 722nd, 723rd, 724th, 725th, 726th, 727th, 728th, 729th, 730th, 731st, 732nd, 733rd, 734th, 735th, 736th, 737th, 738th, 739th, 740th, 741st, 742nd, 743rd, 744th, 745th, 746th, 747th, 748th, 749th, 750th, 751st, 752nd, 753rd, 754th, 755th, 756th, 757th, 758th, 759th, 760th, 761st, 762nd, 763rd, 764th, 765th, 766th, 767th, 768th, 769th, 770th, 771st, 772nd, 773rd, 774th, 775th, 776th, 777th, 778th, 779th, 780th, 781st, 782nd, 783rd, 784th, 785th, 786th, 787th, 788th, 789th, 790th, 791st, 792nd, 793rd, 794th, 795th, 796th, 797th, 798th, 799th, 800th, 801st, 802nd, 803rd, 804th, 805th, 806th, 807th, 808th, 809th, 810th, 811st, 812nd, 813th, 814th, 815th, 816th, 817th, 818th, 819th, 820th, 821st, 822nd, 823rd, 824th, 825th, 826th, 827th, 828th, 829th, 830th, 831st, 832nd, 833rd, 834th, 835th, 836th, 837th, 838th, 839th, 840th, 841st, 842nd, 843rd, 844th, 845th, 846th, 847th, 848th, 849th, 850th, 851st, 852nd, 853rd, 854th, 855th, 856th, 857th, 858th, 859th, 860th, 861st, 862nd, 863rd, 864th, 865th, 866th, 867th, 868th, 869th, 870th, 871st, 872nd, 873rd, 874th, 875th, 876th, 877th, 878th, 879th, 880th, 881st, 882nd, 883rd, 884th, 885th, 886th, 887th, 888th, 889th, 890th, 891st, 892nd, 893rd, 894th, 895th, 896th, 897th, 898th, 899th, 900th, 901st, 902nd, 903rd, 904th, 905th, 906th, 907th, 908th, 909th, 910th, 911st, 912nd, 913th, 914th, 915th, 916th, 917th, 918th, 919th, 920th, 921st, 922nd, 923rd, 924th, 925th, 926th, 927th, 928th, 929th, 930th, 931st, 932nd, 933rd, 934th, 935th, 936th, 937th, 938th, 939th, 940th, 941st, 942nd, 943rd, 944th, 945th, 946th, 947th, 948th, 949th, 950th, 951st, 952nd, 953rd, 954th, 955th, 956th, 957th, 958th, 959th, 960th, 961st, 962nd, 963rd, 964th, 965th, 966th, 967th, 968th, 969th, 970th, 971st, 972nd, 973rd, 974th, 975th, 976th, 977th, 978th, 979th, 980th, 981st, 982nd, 983rd, 984th, 985th, 986th, 987th, 988th, 989th, 990th, 991st, 992nd, 993rd, 994th, 995th, 996th, 997th, 998th, 999th, 1000th, 1001st, 1002nd, 1003rd, 1004th, 1005th, 1006th, 1007th, 1008th, 1009th, 1010th, 1011st, 1012nd, 1013th, 1014th, 1015th, 1016th, 1017th, 1018th, 1019th, 1020th, 1021st, 1022nd, 1023rd, 1024th, 1025th, 1026th, 1027th, 1028th, 1029th, 1030th, 1031st, 1032nd, 1033rd, 1034th, 1035th, 1036th, 1037th, 1038th, 1039th, 1040th, 1041st, 1042nd, 1043rd, 1044th, 1045th, 1046th, 1047th, 1048th, 1049th, 1050th, 1051st, 1052nd, 1053rd, 1054th, 1055th, 1056th, 1057th, 1058th, 1059th, 1060th, 1061st, 1062nd, 1063rd, 1064th, 1065th, 1066th, 1067th, 1068th, 1069th, 1070th, 1071st, 1072nd, 1073rd, 1074th, 1075th, 1076th, 1077th, 1078th, 1079th, 1080th, 1081st, 1082nd, 1083rd, 1084th, 1085th, 1086th, 1087th, 1088th, 1089th, 1090th, 1091st, 1092nd, 1093rd, 1094th, 1095th, 1096th, 1097th, 1098th, 1099th, 1100th, 1101st, 1102nd, 1103rd, 1104th, 1105th, 1106th, 1107th, 1108th, 1109th, 1110th, 1111st, 1112nd, 1113th, 1114th, 1115th, 1116th, 1117th, 1118th, 1119th, 1120th, 1121st, 1122nd, 1123rd, 1124th, 1125th, 1126th, 1127th, 1128th, 1129th, 1130th, 1131st, 1132nd, 1133rd, 1134th, 1135th, 1136th, 1137th, 1138th, 1139th, 1140th, 1141st, 1142nd, 1143rd, 1144th, 1145th, 1146th, 1147th, 1148th, 1149th, 1150th, 1151st, 1152nd, 1153rd, 1154th, 1155th, 1156th, 1157th, 1158th, 1159th, 1160th, 1161st, 1162nd, 1163rd, 1164th, 1165th, 1166th, 1167th, 1168th, 1169th, 1170th, 1171st, 1172nd, 1173rd, 1174th, 1175th, 1176th, 1177th, 1178th, 1179th, 1180th, 1181st, 1182nd, 1183rd, 1184th, 1185th, 1186th, 1187th, 1188th, 1189th, 1190th, 1191st, 1192nd, 1193rd, 1194th, 1195th, 1196th, 1197th, 1198th, 1199th, 1200th, 1201st, 1202nd, 1203rd, 1204th, 1205th, 1206th, 1207th, 1208th, 1209th, 1210th, 1211st, 1212nd, 1213th, 1214th, 1215th, 1216th, 1217th, 1218th, 1219th, 1220th, 1221st, 1222nd, 1223rd, 1224th, 1225th, 1226th, 1227th, 1228th, 1229th, 1230th, 1231st, 1232nd, 1233rd, 1234th, 1235th, 1236th, 1237th, 1238th, 1239th, 1240th, 1241st, 1242nd, 1243rd, 1244th, 1245th, 1246th, 1247th, 1248th, 1249th, 1250th, 1251st, 1252nd, 1253rd, 1254th, 1255th, 1256th, 1257th, 1258th, 1259th, 1260th, 1261st, 1262nd, 1263rd, 1264th, 1265th, 1266th, 1267th, 1268th, 1269th, 1270th, 1271st, 1272nd, 1273rd, 1274th, 1275th, 1276th, 1277th, 1278th, 1279th, 1280th, 1281st, 1282nd, 1283rd, 1284th, 1285th, 1286th, 1287th, 1288th, 1289th, 1290th, 1291st, 1292nd, 1293rd, 1294th, 1295th, 1296th, 1297th, 1298th, 1299th, 1300th, 1301st, 1302nd, 1303rd, 1304th, 1305th, 1306th, 1307th, 1308th, 1309th, 1310th, 1311st, 1312nd, 1313th, 1314th, 1315th, 1316th, 1317th, 1318th, 1319th, 1320th, 1321st, 1322nd, 1323rd, 1324th, 1325th, 1326th, 1327th, 1328th, 1329th, 1330th, 1331st, 1332nd, 1333rd, 1334th, 1335th, 1336th, 1337th, 1338th, 1339th, 1340th, 1341st, 1342nd, 1343rd, 1344th, 1345th, 1346th, 1347th, 1348th, 1349th, 1350th, 1351st, 1352nd, 1353rd, 1354th, 1355th, 1356th, 1357th, 1358th, 1359th, 1360th, 1361st, 1362nd, 1363rd, 1364th, 1365th, 1366th, 1367th, 1368th, 1369th, 1370th, 1371st, 1372nd, 1373rd, 1374th, 1375th, 1376th, 1377th, 1378th, 1379th, 1380th, 1381st, 1382nd, 1383rd, 1384th, 1385th, 1386th, 1387th, 1388th, 1389th, 1390th, 1391st, 1392nd, 1393rd, 1394th, 1395th, 1396th, 1397th, 1398th, 1399th, 1400th, 1401st, 1402nd, 1403rd, 1404th, 1405th, 1406th, 1407th, 1408th, 1409th, 1410th, 1411st, 1412nd, 1413th, 1414th, 1415th, 1416th, 1417th, 1418th, 1419th, 1420th, 1421st, 1422nd, 1423rd, 1424th, 1425th, 1426th, 1427th, 1428th, 1429th, 1430th, 1431st, 1432nd, 1433rd, 1434th, 1435th, 1436th, 1437th, 1438th, 1439th, 1440th, 1441st, 1442nd, 1443rd, 1444th, 1445th, 1446th, 1447th, 1448th, 1449th, 1450th, 1451st, 1452nd, 1453rd, 1454th, 1455th, 1456th, 1457th, 1458th, 1459th, 1460th, 1461st, 1462nd, 1463rd, 1464th, 1465th, 1466th, 1467th, 1468th, 1469th, 1470th, 1471st, 1472nd, 1473rd, 1474th, 1475th, 1476th, 1477th, 1478th, 1479th, 1480th, 1481st, 1482nd, 1483rd, 1484th, 1485th, 1486th, 1487th, 1488th, 1489th, 1490th, 1491st, 1492nd, 1493rd, 1494th, 1495th, 1496th, 1497th, 1498th, 1499th, 1500th, 1501st, 1502nd, 1503rd, 1504th, 1505th, 1506th, 1507th, 1508th, 1509th, 1510th, 1511st, 1512nd, 1513th, 1514th, 1515th, 1516th, 1517th, 1518th, 1519th, 1520th, 1521st, 1522nd, 1523rd, 1524th, 1525th, 1526th, 1527th, 1528th, 1529th, 1530th, 1531st, 1532nd, 1533rd, 1534th, 1535th, 1536th, 1537th, 1538th, 1539th, 1540th, 1541st, 1542nd, 1543rd, 1544th, 1545th, 1546th, 1547th, 1548th, 1549th, 1550th, 1551st, 1552nd, 1553rd, 1554th, 1555th, 1556th, 1557th, 1558th, 1559th, 1560th, 1561st, 1562nd, 1563rd, 1564th, 1565th, 1566th, 1567th, 1568th, 1569th, 1570th, 1571st, 1572nd, 1573rd, 1574th, 1575th, 1576th, 1577th, 1578th, 1579th, 1580th, 1581st, 1582nd, 1583rd, 1584th, 1585th, 1586th, 1587th, 1588th, 1589th, 1590th, 1591st, 1592nd, 1593rd, 1594th, 1595th, 1596th, 1597th, 1598th, 1599th, 1600th, 1601st, 1602nd, 1603rd, 1604th, 1605th, 1606th, 1607th, 1608th, 1609th, 1610th, 1611st, 1612nd, 1613th, 1614th, 1615th, 1616th, 1617th, 1618th, 1619th, 1620th, 1621st, 1622nd, 1623rd, 1624th, 1625th, 1626th, 1627th, 1628th, 1629th, 1630th, 1631st, 1632nd, 1633rd, 1634th, 1635th, 1636th, 1637th, 1638th, 1639th, 1640th, 1641st, 1642nd, 1643rd, 1644th, 1645th, 1646th, 1647th, 1648th, 1649th, 1650th, 1651st, 1652nd, 1653rd, 1654th, 1655th, 1656th, 1657th, 1658th, 1659th, 1660th, 1661st, 1662nd, 1663rd, 1664th, 1665th, 1666th, 1667th, 1668th, 1669th, 1670th, 1671st, 1672nd, 1673rd, 1674th, 1675th, 1676th, 1677th, 1678th, 1679th, 1680th, 1681st, 1682nd, 1683rd, 1684th, 1685th, 1686th, 1687th, 1688th, 1689th, 1690th, 1691st, 1692nd, 1693rd, 1694th, 1695th, 1696th, 1697th, 1698th, 1699th, 1700th, 1701st, 1702nd, 1703rd, 1704th, 1705th, 1706th, 1707th, 1708th, 1709th, 1710th, 1711st, 1712nd, 1713th, 1714th, 1715th, 1716th, 1717th, 1718th, 1719th, 1720th, 1721st, 1722nd, 1723rd, 1724th, 1725th, 1726th, 1727th, 1728th, 1729th, 1730th, 1731st, 1732nd, 1733rd, 1734th, 1735th, 1736th, 1737th, 1738th, 1739th, 1740th, 1741st, 1742nd, 1743rd, 1744th, 1745th, 1746th, 1747th, 1748th, 1749th, 1750th, 1751st, 1752nd, 1753rd, 1754th, 1755th, 1756th, 1757th, 1758th, 1759th, 1760th, 1761st, 1762nd, 1763rd, 1764th, 1765th, 1766th, 1767th, 1768th, 1769th, 1770th, 1771st, 1772nd, 1773rd, 1774th, 1775th, 1776th, 1777th, 1778th, 1779th, 1780th, 1781st, 1782nd, 1783rd, 1784th, 1785th, 1786th, 1787th, 1788th, 1789th, 1790th, 1791st, 1792nd, 1793rd, 1794th, 1795th, 1796th, 1797th, 1798th, 1799th, 1800th, 1801st, 1802nd, 1803rd, 1804th, 1805th, 1806th, 1807th, 1808th, 1809th, 1810th, 1811st, 1812nd, 1813th, 1814th, 1815th, 1816th, 1817th, 1818th, 1819th, 1820th, 1821st, 1822nd, 1823rd, 1824th, 1825th, 1826th, 1827th, 1828th, 1829th, 1830th, 1831st, 1832nd, 1833rd, 1834th, 1835th, 1836th, 1837th, 1838th, 1839th, 1840th, 1841st, 1842nd, 1843rd, 1844th, 1845th, 1846th, 1847th, 1

If your priorities when making purchases include high-quality products and budget-minded prices, then call MidWest Micro—the company where *you're* the main priority, and excellence and value are simply in our nature.

<http://www.mwmicro.com>

WITH PRICES THIS LOW, BY THE TIME YOU READ THIS, IT MAY BE TOO LATE.

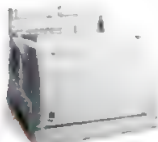
As recently as February of 1996, these Texas Instruments printers were winning major awards. Today, we're selling them at incredibly low prices.* So buy now and save money!



microLaser WIN/4
Ideal for Home or Small Office

- 4 pages per minute
- True 600 x 600 dpi
- 100-sheet universal paper feeder
- Ultra compact size
- Windows®/Windows 95 compatible

NOW \$379



TECHNOMART
BEST

microLaser 600
Affordable PostScript® Solution

- 5 pages per minute
- True 600 x 600 dpi
- 250-sheet tray & straight paper path
- Mac®, Windows & DOS ready
- PS Level 2 & PCL™5 emulation

NOW \$679



MacUser
★★★★

microLaser PowerPro
High Performance Printing

- 12 pages per minute
- True 600 x 600 dpi
- 500-sheet paper capacity
- Mac, Windows & DOS ready
- PS Level 2 & PCL5 emulation

NOW \$1199



PC WORLD
TOP 10

All printers come with a 1 year limited warranty and toll free technical support.

**TEXAS
INSTRUMENTS**

TI EXPRESS
1-800-TI-TEXAS,
Select opt. 2, then 1

CDW
1-800-304-4CDW

Insight
1-800-359-1588

PC Connection
1-800-600-9257

USA★FLEX
1-800-477-8323

Dealer prices may vary. *Offer good while supply lasts. Mac is a registered trademark of Apple Computer, Inc. Windows is a registered trademark of Microsoft Corp. PostScript is a registered trademark of Adobe Systems, Inc. PCL is a trademark of Hewlett-Packard. microLaser is a trademark of Texas Instruments. ©1996 TI.

CIRCLE 305 ON READER SERVICE CARD

PCs COMPLEAT

800-827-1484

CALL
for
**Guaranteed
Lowest
Price**
on
Systems*
*Call for details

Call
for a
**FREE
PRODUCT
GUIDE**

COMPLEAT

✓ **Guaranteed 2nd Day Delivery** ✓ **30-Day Money Back Guarantee**

AST
Authorized Reseller

**\$50 rebate on
MS Office
& Office Pro**
Call for details
With purchase of AST Ascentia Notebook
or Bravo MB or LC Desktop



Ascentia P

AST Ascentia P

- Pentium 100MHz and 133MHz processors
- Standard SmartBay - swap 4X CD-ROM, 3.5" floppies or optional 2nd battery
- 11.3" Dual Scan & Active displays with 800x600 resolutions
- 800MB & 1.2GB removable hard drives
- Built-in Soundblaster 16 Vibrachipset

Processor	Screen	RAM/HD	Price
Pentium 100	11.3" Dual Scan SVGA	8/800MB	\$3300
Pentium 100	11.3" Dual Scan SVGA	8MB/1.2GB	3780
Pentium 133	11.3" Active SVGA	8/800MB	4250
Pentium 133	11.3" Active SVGA	8MB/1.2GB	4730

AST Ascentia J

- Integrated 14.4/14.4 Data/fax modem and audio
- PCI bus architecture with 256KB Level 2 cache
- 10.4" SVGA (800x600) resolution Dual Scan and Active display

Processor	Screen	RAM/HD	Price
Pentium 75	10.4" Dual Scan SVGA	8/500MB	\$2150
Pentium 100	10.4" Dual Scan SVGA	8/800MB	2640
Pentium 100	10.4" Active Matrix SVGA	8/800MB	2840
Pentium 133	10.4" Active Matrix SVGA	8/800MB	3300

AST AST logo are trademarks of AST Research, Inc. All rights reserved.

SHARP

NEW ZAURUS ZR-5800FX

PCs Compleat now carries
**Sharp Personal Organizer and
Wizard Products.**
Call for details & pricing

Sharp PC-3000/ 9000 Series

- GlidePoint™ pointer - the latest technology, the easiest to use
- Built-in 4X CD-ROM drive (selected models)
- 32-bit VESA Local bus graphics
- Built-in 16-bit SoundBlaster compatible sound, microphone & 2 speakers (selected models)
- Built-in 14.4 or 28.8Kbps voice/data/fax modem (selected models)

NEW MODEL!

Processor	Screen	RAM/HD	Price
5x86 100MHz	10.4" Dual Scan	8/515MB	\$1699
5x86 100MHz	10.4" Dual Scan	8/515MB	2079*
Pentium 100	11.3" Dual Scan	8MB/1GB	3000†
Pentium 120	11.3" Active SVGA	8MB/1GB	3600†
Pentium 133	12.1" Active SVGA	16MB/1GB	5800†

* Includes built-in sound system & voice/data/fax/modem
† Includes built-in 4X CD-ROM drive



PC-3020

TEXAS INSTRUMENTS

Extensa 510

Processor	Screen	RAM/HD	Price
Pentium 100	10.4" Dual Scan	8/810MB	\$2250

New Models!



Extensa 560

Extensa 560/570 CD & CDT

- 75MHz & 100MHz Pentium processors w/PCI bus & 256KB cache
- Built-in 4X CD-ROM drive
- Built-in 16-bit sound, microphone & speaker

Processor	Screen	RAM/HD	Price
Pentium 75	10.4" Dual Scan	8/810MB	\$2499
Pentium 75	10.4" Active	8MB/1.2GB	3499
Pentium 100	11.3" Dual Scan	8/810MB	2999
Pentium 100	10.4" Active	8MB/1.2GB	3999

TravelMate 5130/5270/5300

Processor	Screen	RAM/HD	Price
Pentium 90	10.4" Active SVGA	8MB/1.2GB	\$3420
Pentium 120	11.3" Active SVGA	8MB/1.2GB	4199
Pentium 133	11.3" Active SVGA	8MB/1.2GB	4499

**Ask about
TravelMate 5270 & 5300
accessories promotion!**

hp HEWLETT PACKARD



HP OmniBook
600 Notebook PC

HP OmniBook 600

- Weighs **ONLY 3.8 pounds!**
- Built-in 16-bit sound, microphone & speaker
- Built-in infrared for wireless communications
- Enhanced battery technology
- Instant ON - ready to work state - lasts for months on a charge

Processor	Screen	RAM/HD	Price
486DX4/75	9.5" Active	8/340MB	\$2500

Additional HP OmniBook models available! Call for details.

HP OmniBook 5500

- 133MHz Pentium with 32-bit PCI Local bus
- 12.1" Active Matrix display with 65,000 colors
- Super VGA 800x600 resolution on notebook
- PCI local bus Video 1.5MB video memory
- 16-bit stereo sound with 2 speakers
- Optional 4X CD-ROM available

Processor	Screen	RAM/HD	Price
Pentium 133	12.1" Active SVGA	16MB/1.35GB	\$6000



HP OmniBook
5500 Notebook PC

IBM

**CHOOSE
YOUR O/S**
DOS/WIN 3.11 & OS/2 WARP
OR
WINDOWS 95

PC 300® Series

- Powerful Pentium processors - 90MHz, 100MHz, 133MHz, 166MHz
- Accelerated 64-bit PCI local bus graphics
- PCMCIA drive bay available
- Multiple chassis sizes to get the expansion you need - slimline or desktop
- Support for up to 4 IDE devices
- 3-year warranty with Online Housecall remote problem resolution

PC 700 Series Also Available!

Processor	RAM/HD	Sci/Bay	Price
Pentium 90	16/850MB	5/5	\$1898
Pentium 100	16MB/1.2GB	3/3	2099
Pentium 100	16/850MB	5/5	2013
Pentium 133	16MB/1.2GB	5/5	2243
Pentium 166	16MB/1.2GB	5/5	3019

Monitors priced separately

Additional PC 300 models available. Call for details.



IBM PC 300

Monitors
priced
separately

ONLY at PCs COMPLEAT

✓ **Lowest Price
Guarantee**

✓ **30-Day Money
Back Guarantee**

✓ **Free Tech
Support**

✓ **Free Software
Installation**

✓ **Free
Configuration**

SATISFACTION.

PCs
COMPLEAT

✓ Free Software Installation ✓ Free Tech Support ✓ Free Configuration

800-827-1484

digital™

**High-Fidelity
JBL Speakers**



Monitors priced separately **Digital Starion**

**WIN95
INSTALLED**

Digital Starion

**Windows 95
Multimedia Computers**

- 4X CD-ROM drive
- Up to Pentium 166MHz - blazing speed!
- PCI local bus - high speed graphics
- Unbelievable sound! SoundBlaster Pro-compatible 32W WaveTable Premium JBL speaker system (offers by model)
- 28.8Kb modem and advanced telephony features (offers by model)
- Loads of **FREE** software pre-installed

Processor	RAM/HD	CD-ROM	Price
Pentium 75	8/850MB	4X	\$1399
Pentium 75	8MB/1.2GB	4X	1449
Pentium 100	8MB/1.2GB	4X	1599
Pentium 120	16MB/1.6GB	4X	2199
Pentium 133	16MB/1.6GB	4X	2299
Pentium 150	16MB/1.6GB	4X	2349
Pentium 166	16MB/1.6GB	4X	2599

Monitors priced separately

NEC

**All Models
Optimized for
WIN 95**



NEC Ready Multimedia

**WIN95
INSTALLED**

Monitors
priced
separately

Ready Multimedia

For Windows 95

- 6X CD-ROM drive*
- SoundBlaster compatible audio integrated on the system board
- 28.8Kb modem, full duplex speaker phone & answering machine
- Built-in MPEG support for full screen full motion video
- 32-bit PCI controller for fast disk performance
- LOADS of **FREE** software
- *4X CD-ROM on 7610

Processor	RAM/HD	CD-ROM	Price
Pentium 120	8MB/1.2GB	4X	\$1799
Pentium 133	8MB/1.2GB	6X	2199
Pentium 150	8MB/1.2GB	6X	1999
Pentium 120	16MB/1.6GB	6X	2499
Pentium 133	16MB/1.6GB	6X	2299
Pentium 150	16MB/2GB	6X	2799
Pentium 166	16MB/2GB	6X	2999

Monitors priced separately

AST®

Authorized Reseller

**150&166MHz
PENTIUM**

AST AST logo are trademarks of AST Research Inc. All rights reserved.

Advantage Adventure Multimedia (6X CD-ROM)

- 6X CD-ROM drive
- 6X CD-ROM Drive w/3disc CD changer (selected models)
- Advanced Telephony - 28.8Kb fax/modem, telephone answering system and speaker phone (offers by model, call for details)
- Integrated 3-D surround sound (selected models)
- 64-Bit PCI Local bus graphics
- AST Works II navigation software - featuring SPOT
- Enhanced IDE interface, fast disk performance

Processor	RAM/HD	CD-ROM	Price
Pentium 100	16MB/1.2GB	6X	\$1599
Pentium 133	16MB/1.2GB	6X	2150
Pentium 150	16MB/1.6GB	6X	2370
Pentium 100	16MB/1.2GB	6X	1699
Pentium 133	16MB/1.6GB	6X	2300
Pentium 150	16MB/2.1GB	6X†	2640
Pentium 166	16MB/2.1GB	6X†	2830

† w/3disc CD changer
Monitors priced separately



**WIN95
INSTALLED**

Monitors
priced
separately

AST Advantage Adventure



**HEWLETT
PACKARD**

**BIG SAVINGS ON
HP PRINTER
BUNDLES**

\$289.99

**Built-in
30-page
sheet feeder**

**OR
SAVE 5%**

\$309.99

SAVE 35%

\$199.99

HP LaserJet Printers

HP LaserJet 5L printer (IBM 4ppm 600dpi) C3941A \$ 479.00
HP LaserJet 5P printer (IBM 6ppm 600dpi) C3150A .. 879.99

HP InkJet Printers

HP DeskJet 340 printer (portable) C2655A \$ 289.99†
HP DeskJet 340 CY (bundle) C2664A 309.99†
HP DeskJet 320 (bundle) C2637A/ABA 199.99†
HP DeskJet 600 printer C2184A 209.00
HP DeskJet 600C printer C4547A 259.00†
HP DeskJet 600C printer C2164A 359.00†
HP DeskJet 660Cse printer C4548A 369.00†
HP DeskJet 855C printer C4551A 449.00†
HP DeskJet 855C printer C4551A/ABA 499.00†
HP DeskJet 1600C printer C3540A 1349.99†

Home Office Products

HP OfficeJet LX C2891A \$ 599.99
HP FAX-700 C3530A 509.99

* Includes Family Font Package

† Includes HP Color Kit

**New
Model!**

C4568A/ABA
HP DeskJet 820Cse

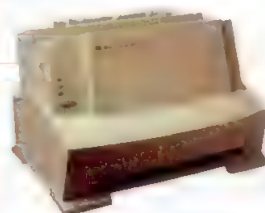


Hewlett-Packard Scanners

HP ScanJet 4C scanner C2527B \$ 949.99
HP ScanJet 4S portable scanner C1127A 319.00

HP Tape Drives

HP T1000 (internal) C4320RB \$ 169.00
HP T1000e (portable) C4326RB 219.99
HP SureStore, 2GB, DAT, Int C1525E 939.99
HP SureStore, 8GB, DAT, Ext C1529E 1450.00



C3941A
HP LaserJet XL

C4548A
HP DeskJet 660Cse



**More Brand Names, Peripherals and Software
available. If you don't see it, CALL!**

International: 508-624-6400
Email: sales@pcsmpleat.com
Visit us at www.pcsmpleat.com
Open 24 Hours weekdays, 9am-6pm weekends.

800-827-1484

CIRCLE 092 ON READER SERVICE CARD

PCs

COMPLEAT

800-827-1484

CALL for
Guaranteed
Lowest
Price
on
Systems*
*Call for details

THE BEST BRANDS

TOSHIBA



WIN95
INSTALLED

Satellite Pro 410

Satellite Pro 410

- Built-in 4X CD-ROM Drive (Active models only)
- Built-in 16-bit sound, microphone, speaker & MIDI
- EDO RAM memory expandable to 40MB
- Built-in V adapter, small sleek design & reduced weight
- Integrated Accupoint, small, accurate & easy to use
- Lithium Ion battery technology
- Built-in infrared for wireless communications

Processor	Screen	RAM/HD	Price
Pentium 90	11.3" Dual Scan SVGA	8/772MB	\$3199
Pentium 90	11.3" Active SVGA	8/772MB	\$3999*

*Features built-in 4X CD-ROM drive

Satellite 100CS

Processor	Screen	RAM/HD	Price
Pentium 75	10.4" Dual Scan	8/500MB	\$1969*

*Features EDO RAM memory

Portégé 610CT

- Pentium 90MHz processor
- 9.5" True Color display for optimum color
- Built-in 16-bit SoundBlaster Pro compatible sound, microphone & speaker
- Lithium Ion battery technology
- Integrated Accupoint for easy control

Processor	Screen	RAM/HD	Price
Pentium 90	9.5" True Color	8/720MB	\$3899



6X Speed!

6X Speed!

Tecra 720

Power
Pentium

WIN95
INSTALLED



Portégé 610CT

Tecra 700 and 720

- PCI bus architecture (internal & external)
- 11.3" 800x600 high res. display (Tecra 700)
- Optional 4X CD-ROM Drive (Tecra 700)

Processor	Screen	RAM/HD	Price
Pentium 120	11.3" Dual Scan SVGA	8MB/1.13GB	\$3999
Pentium 120	11.3" Active SVGA	16MB/1.13GB	\$4999
Pentium 133	12.1" Active SVGA	16MB/1.2GB	\$7469*

*Features built-in 6X CD-ROM drive

TOSHIBA



Factory Refurbished Products
Call For Details

Introducing Toshiba Refurbished Notebooks

- Manufacturer Warranty
- Toll-Free Technical Support
- 7-Day Lowest Price Guarantee and Return Policy

Prices as low as \$999!

Best models, best quality
at a price worthy of
a standing ovation.

Call today for latest models.

IBM



ThinkPad® 760

- Up to 120MHz Pentium with 32-bit Local bus
- 12.1" Active display with 800x600 resolution (selected models)
- 4X CD-ROM Drive, MPEG-2 support, & full motion video (ThinkPad 760C*)
- Built-in 28.8 fax/modem
- SoundBlaster-compatible audio & telephony
- Lithium Ion battery technology



ThinkPad® 760

Processor	Screen	RAM/HD	Price
P90	10.4" Active SVGA	8/720MB	\$4999
P90	12.1" Active SVGA	8/720MB	\$4999
P120	12.1" Active SVGA	8/720MB	\$6999
P120	12.1" Active SVGA	8MB/1.0GB	\$9999
P90	12.1" Active SVGA	8MB/1.2GB	\$6999*
P120	12.1" Active SVGA	8MB/1.2GB	\$8999*

*Features built-in 4X CD-ROM drive
Windows 95 models available. Call for details.

BIG!
12.1" Display

UP TO
120MHz
PENTIUM

ThinkPad® 760L and 760LD

- 10.4" Active display
- 32-bit accelerated local bus video
- Built-in soundcard, speakers & microphone
- 256KB Level 2 cache
- Tilting keyboard with palm rest

Processor	Screen	RAM/HD	Price
Pentium 90	10.4" Active	8/810MB	\$4249
Pentium 90	10.4" Active	8/810MB	\$4549*

*Includes built-in 4X CD-ROM drive
Windows 95 models also available.
Call for details.



ThinkPad® 760LD

ThinkPad® 760EL and 760ELD

Processor	Screen	RAM/HD	Price
Pentium 130	11.3" Dual Scan	8.8 MB	\$3349
Pentium 130	12.1" Active SVGA	8.8 MB	\$4999*
Pentium 120	11.3" Dual Scan	8.8 MB	\$3549
Pentium 120	12.1" Active SVGA	8MB/1.0GB	\$4899
Pentium 133	12.1" Active SVGA	16MB/1.0GB	\$5399

*Includes built-in 4X CD-ROM drive

ThinkPad® 760E and 760ED

Processor	Screen	RAM/HD	Price
Pentium 120	12.1" Active SVGA	8.8 MB	\$4999
Pentium 120	12.1" Active SVGA	8MB/1.2GB	\$5299
Pentium 133	12.1" Active SVGA	8MB/1.38GB	\$5999
Pentium 133	12.1" Active SVGA	8MB/1.2GB	\$6999*

*Includes built-in 4X CD-ROM drive

©1996 PCs Compleat. All prices and specifications subject to change and do not include shipping. All products and brand names are trademarks of their respective companies. PCs Compleat, 34 St. Martin Drive, Marlborough, MA 01752-3021. Phone: (508) 624-6400. Not responsible for typographical errors. All trademarks and registered trademarks are the sole property of their respective owners. Lowest price guarantee applies to system purchases only.

ONLY at PCs COMPLEAT

✓ Lowest Price Guarantee

✓ 30-Day Money Back Guarantee

✓ Free Tech Support

✓ Free Software Installation

✓ Free Configuration

NOTEBOOK AROUND!

Call
for a
FREE
PRODUCT
GUIDE

**PCs
COMPLEAT**

800-827-1484

digital™

Digital HiNote VP

- 100MHz Pentium processors with Mobile Triton PCI bus
- EDO RAM memory for super fast system performance. Memory expansion up to 40MB
- Multi-level security and Win95 compatibility with Flash system BIOS

16-bit stereo sound with built-in microphone on CTS 5100 model. Joystick device and wrist rest offers an interface

Screen	RAM/HD	Price
10.4" Dual Scan	8/810MB	\$2399
10.4" Active	8/810MB	\$2869*

Digital HiNote VP Expansion Options

Replicator with:
Built-in networking connections
Built-in stereo speakers
Joystick and microphone port

**100MHz
PENTIUM
with PCI BUS**

HiNote VP



NEW!

Digital HiNote Ultra II

- Up to 133MHz mobile Pentium processor
- 256KB of internal Level 2 cache
- Oversized 10.4" Active Matrix display
- 16mm trackball with sculpted palm rest

Processor	Screen	RAM/HD	Price
Pentium 100	10.4" Active SVGA	8MB/1.08GB	\$3769
Pentium 120	10.4" Active SVGA	8MB/1.08GB	4059
Pentium 133	10.4" Active SVGA	8MB/1.35GB	4439

Digital HiNote Ultra II Expansion Options

Multi-Media Module for Ultra II

- Built-in 4X CD-ROM, 3 full range stereo speakers and joystick/MIDI port

Port Replicator for Ultra II

- Built-in networking connections
- Built-in keyboard tilt stand
- Lever action to engage/eject

Expansion Dock for Ultra II

- Includes floppy disk drive
- Offers two additional PCMCIA slots

**UP TO
133MHz
PENTIUM**

HiNote Ultra II
Shown with
optional floppy dock



**Only
1.1"
Thick!
ONLY
3.9lbs.!**

**Light
Weight
Ultra
Thin**

NEC

NEC Versa 2205

- 75MHz Pentium
- Built-in 14.4 data fax/modem
- Lithium Ion battery standard
- 810MB removable hard-drive
- 32-bit Local bus graphics

Processor	Screen	RAM/HD	Price
Pentium 75	9.5" Active	8/810MB	\$2499



NEC Versa 4000

NEC Versa 4000

- Built-in 4X CD-ROM Drive! (selected models)
- Up to 120MHz Pentium processors
- 256KB Level 2 cache to optimize performance
- Unbelievable display - 65K color Dual Scan, 16.8 million color Active (High resolution 800x600 Active Matrix displays available)
- Built-in 16-bit sound, microphone, MIDI and 2 built-in speakers
- Multimedia docking station with outstanding Altec Lansing 4 speaker array (optional accessory, priced separately)

**Now Available
with 4X CD-ROM**

Processor	Screen	RAM/HD	Price
Pentium 75	10.1" Active	8/810MB	\$3799*
Pentium 90	10.4" High Res.	8/810MB	4099
Pentium 90	10.1" Active	8/810MB	4349*
Pentium 120	10.4" High Res.	8MB/1GB	4399

* Features built-in 4X CD-ROM drive

COMPAQ

Compaq Ventura 430

- 4" Active & Dual Scan
- 486DX4/100 processors
- Optical trackball - smoother and more reliable
- High capacity 720MB drives
- Up to 3 year worldwide warranty

Processor	Screen	RAM/HD	Price
Pentium 100	10.4" Dual Scan	8/720MB	\$2369
486DX4/100	10.4" Active	8/720MB	2939

LTE 5000 Series

- Up to 120MHz Pentium power w/PCI bus & 256KB cache
- 32-bit PCI Local bus graphics
- 8MB RAM exp. to 72MB
- Built-in 16-bit sound, microphone & 2 speakers
- MultiBay - holds CD-ROM, 2nd HDD, floppy or 2nd battery
- Up to 1.35GB hard drives
- Built-in infrared for wireless communications
- Supports NiMH batteries
- Optional MPEG and TV video adapter

**UP TO
120MHz
PENTIUM
with PCI BUS**

**Call about NEW
LTE Models!**

Processor	Screen	RAM/HD	Price
Pentium 75	10.4" Dual Scan	8/510MB	\$2830
Pentium 75	11.3" Dual Scan	8/810MB	3210
Pentium 75	10.4" Active	8/810MB	3590
Pentium 90	10.4" Active	8/810MB	3970
Pentium 90	10.4" Active	8/810MB	4340*
Pentium 120	10.4" Active	8MB/1.35GB	4720

* Features Built-in 4X CD-ROM drive

**UP TO
120MHz
PENTIUM
with PCI BUS**



LTE 5000

**More Brand Names, Peripherals and Software
available. If you don't see it, CALL!**

International: 508-624-6400
Email: sales@pcscompleat.com
Visit us at www.pcscompleat.com
Open 24 Hours weekdays, 8am-8pm weekends.

800-827-1484

CIRCLE 268 ON READER SERVICE CARD

COMPUSA IS JUST A PHONE CALL AWAY.



NEC

120 MHZ Pentium® Processor

Multimedia Minitower 9616 #117209

16 MB RAM • 1.6 GB HD • 6X CD-ROM • 28.8 Internal Fax/Modem • Full-Screen MPEG Video • 20 Software Titles Including Windows®95, MS Works 95 and Quicken (Some software is preloaded. Manuals/diskettes not included. Monitor Sold Separately)

1899⁹⁷

15" .28 NI Monitor #117435 \$399.99 (13.8" DVIS)



Packard Bell

150 MHZ Pentium® Processor

Multimedia Minitower PLTX #117112

16 MB RAM • 1.6 GB HD • 6X CD-ROM • 28.8 Internal Fax/Modem • Full Duplex Speakerphone • Internet Ready • MPEG Video • 27 Software Titles Including Windows®95, Quicken and MS Encarta

(Some software is preloaded. Manuals/diskettes not included. Monitor Sold Separately)

2299⁹⁷

15" .28 NI Monitor #474593 \$399.99 (13.5" Diagonal Viewable Image Size)



TOSHIBA

75 MHz Pentium® Processor Notebook Computer 105CS #116925

8 MB RAM • 500 MB HD • 10.4" Dual Scan Screen • Built-In Accupoint Pointing Device Built-In Power Supply

1999⁹⁹



Packard Bell

120 MHZ Pentium® Processor Multimedia Minitower

F4650 #116139

8 MB RAM • 1.0 GB HD • Quad Speed 4X CD-ROM • 28.8 Fax/Modem • 16-Bit 3D Stereo Sound • MPEG Full Motion Video Some software is preloaded. Manuals/diskettes not included. Monitor Sold Separately.

1599⁹⁷



NEC Superscript 660 Printer

#119502

600 dpi • 6 ppm Print Speed 31 True Type Fonts • 2-Year Warranty

399⁹⁹

Notebooks

Toshiba 4X CD-ROM 405/415 #105032199⁹⁹
HiNote CSS 5100 P100 8/810 #1170972499⁹⁹
Toshiba 405CS P75 8/810 #1094812699⁹⁹
Canon 360 CD 586 8/810 4X #1173452699⁹⁹
HiNote CTS 5100 P100 8/810 #1170992999⁹⁹
Toshiba 415 CS P90 8/810 #1099893199⁹⁹

PC Cards

Xircor 10 Base T Ethernet #487253149⁹⁹
3 Com Etherlink III TP #110135169⁹⁹
Practical Peripherals Pro Class 28.8 #625664 239⁹⁹
Megahertz 28.8 #615822319⁹⁹
Xircor 28.8 Ethernet & Modem #107222469⁹⁹
Motorola 28.8 Ethernet & Modem #119541489⁹⁹

Computers

Packard Bell F3570 P100 8/1.0 GB 4X #1171101399⁹⁹
Packard Bell Platinum P33 16/12 GB 2X #116774 1999⁹⁹
Packard Bell PP700 P150 24/2 GB #1171152499⁹⁹
IBM A40 P133 16/2 GB #1161822599⁹⁹
IBM AS2 P150 16/2 GB 6X #1161792899⁹⁹
IBM A92 P166 16/2 GB 6X #1161833099⁹⁹

Printers

Okidata OL600e #105799399⁹⁹
HP Laserjet SL #105798479⁹⁹
NEC Superscript 860 #121450499⁹⁹
Okidata OL810e #101736779⁹⁹
HP Laserjet SP #666631849⁹⁹
HP Laserjet 5 #1204891299⁹⁹

Call 1-800-266-7872

COMPUSA
DIRECT

Superstore Savings Direct To You

www.compusa.com

6914-06-96

"If you find a lower price on a product in this ad in the current issue of this magazine, we'll beat it. Guaranteed. Offer good on all new in-the-box products of the same brand and model number that are available in stock from any other authorized mail order competitor. It does not apply to competitors' misprints, one-of-a-kind or other limited quantity offers or when a bonus or free offer is included in the purchase. CompUSA Direct prices are available through mail order only and are valid until the next issue of this magazine, or 30 days from the date of this issue, whichever comes first. Prices and specifications are subject to change without notice. We reserve the right to limit quantities. All Hayes modems, laser printers and some other printers, monitors and laptops must be sent to authorized service centers. Any typographical, photographic or production error in products, pricing or offers is subject to correction. Due to manufacturers' restrictions, certain products may not be eligible for international shipment, and certain products may not be available via mail order. Please see your sales representative for details. The Intel Inside and Pentium Processor logos are registered trademarks of the Intel Corporation. Windows is a registered trademark of Microsoft in the U.S. and other countries. Defective merchandise may be replaced with the same item only. We want you to be satisfied with your purchase. If for any reason you are not satisfied, please return the item within 30 days with original receipt or invoice. Opened software may be returned for exchange only. A 15% restocking fee may apply to return items; call or see store for details. All refunds in excess of \$250 will be sent via check from the CompUSA corporate office within 10 days. ** In Connecticut only, instant rebate than mail-in rebate. ©1996 CompUSA Inc. CompUSA and CompUSA Direct are registered trademarks of and Superstore Savings Direct To You is a service mark of CompUSA, Inc.

PCM0696



Microsoft Internet Starter Kit #12098

MS Mail-In Rebate
CompUSA Mail-In Rebate
After Rebates **FREE**



Descent 2: The Sequel #11788

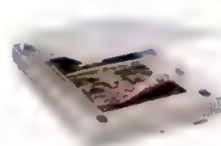
You're Going Down!

\$49.99



Western Digital 2.1GB Hard Drive #117452

Instant Rebate
After Rebate **\$399.99**



HP Scanjet 4P Scanner #116921

\$499.99



NEC XV17+ #117005

17" 281 Monitor • 15.6" DMS*

\$849.97

*Diagonal Viewable Image Size

Communications

Netscape Navigator 2.0 Windows®95/3.1	#118011	39¢
Webtalk V1.0 Windows®95/3.1	#110266	49¢
Incident Spider Windows® CD	#119776	69¢
QuickSite Windows® 3.5	#119894	79¢
Best Data 28.8 Internal	#64402	129¢
U.S. Robotics 28.8 Internal WinModem	#119161	149¢
Connectix Videophone PC for Windows®	#114659	169¢
Practical 28.8 V.34 External	#609050	179¢
Hayes 28.8 Internal Voice w/full duplex speakerphone	#119354	209¢

Accessories

Sony 50 PK 3.5" Disk	#104541	26¢
Mail-In Rebate**		15¢
After Rebate		9¢
TDK 2120 XL 2PK	#102888	21¢
Mail-In Rebate**		8¢
After Rebate		13¢
Fuji 2 PK 4 mm Cartridge	#118510	24¢
Mail-In Rebate**		9¢
After Rebate		15¢
HP Hi-Capacity (Bk) Ink Cartridge	#81661	26¢
Newpoint Surge w/Fax Protector	#571604	25¢
Verbatim 5 Pk CDR	#116166	49¢
CompUSA Instant Rebate		10¢
After Rebate		39¢
Omiga 3 Pk Zip Cartridge	#61943/707220	49¢
3M 2 Pk Travan	#704044	74¢
CompUSA Instant Rebate		15¢
After Rebate		59¢
MS Natural Keyboard 95	#105416	89¢
Alps Glidepoint Keyboard	#112983	99¢

Office Software

Address Book V3.0 Windows® 3.5	#103630	19¢
Daytimer Organizer 2.0 Windows®	#106622	59¢
Filemaker Pro 3.0 Comp Upgrade 3.5	#115092	89¢
BestPlan Builder 5.0 w/Video	#117804	99¢
Lotus 1-2-3 5.0 Windows® Upgrade 3.5	#177692	99¢
Quickbooks 4.0 Windows® 3.5	#115981	99¢
Peachtree Accounting Windows®95	#113083	119¢
MS Word 6.0 Windows® Upgrade 3.5	#226240	119¢
Lotus SmartSuite 4.0 Upgrade Windows® 3.5	#107124/149	199¢
Act 2.0 Windows® 3.5	#321202	199¢

Hard Drives/Tape Drives

Omiga 800 Internal	#107106	129¢
Teac 1.6 GB Internal	#119554	179¢
H/P 800 Tape Drive	#113826	199¢
Omiga 3.2 Internal	#116809	249¢
Conner 1.2 Hard Drive	#610672	249¢
Western Digital 1.2 GB Hard Drive	#633904	249¢
Conner 1.6 Hard Drive	#115536	349¢
Western Digital 1.6 GB Hard Drive	#663990	349¢
Maxtor 2.0 GB Hard Drive	#109922	349¢
Western Digital 2.5 GB Hard Drive	#117358	499¢

Memory

PC Memory		
PC Memory 4 MB (1x32)	#28825	89¢
PC Memory 8 MB (2x32)	#534891	179¢
PC Memory 16 MB (4x32)	#534888	369¢
Mac Memory		
Mac Memory Techworks 8 MB (1x64) DDM	#104306	299¢
Mac Memory Techworks 16 MB (2x64) DDM	#104305	599¢
Intel Overdrive Processors		
P60/P66 - P120/P133	#119398	399¢
P75 - P125	#119568	399¢
16 MB 4x32	#637984	Call For Prices
16 MB 4x36	#619693	Call For Prices
4 MB 1x32	#113144	Call For Prices
8 MB 2x32	#104055	Call For Prices

Printers

Epson Stylus Color II S	#103404	199¢
Mail-In Rebate**		30¢
After Rebate		169¢
Epson Stylus Color II	#103529	299¢
Mail-In Rebate**		30¢
After Rebate		269¢
HP Deskjet 680C	#120441	329¢
HP Deskjet 820CSE	#120440	399¢
Canon BJC 610	#105333	429¢
HP Deskjet 855CSE	#120438	499¢
Creative Sound Blaster 16 Plug and Play	#106886	99¢
Creative Sound Blaster 32 Plug and Play	#110745	169¢
Play Snappy Video Capture	#110903	199¢
Epson Digital Camera	#115721	499¢
Casio Digital Camera	#110055	499¢

Multimedia

CD-ROM Software

Quicken Business Law Partner	#119996	29¢
Java Starter Kit CD Windows®	#118449	44¢
Streetfinder 96 Windows® CD	#107359	49¢
MS Publisher 95 CD	#111336	69¢
Select Street Atlas	#110471	99¢
SelectPhone 96 Windows®/Mac™ CD	#117408	99¢
Business Map Windows®	#117057	99¢
Quickbooks Pro CD	#115750	199¢
Borland C++ v5.0 Comp Upgrade CD	#118450	239¢
MS Office Pro 95 Upgrade w/Bookshelf	#115106	299¢
Version Upgrade Mail-In Rebate**		40¢
After Rebate		259¢

Networking

Linksys Ethernet Combo Card	#119802	44¢
Linksys 5 Port Ethernet Hub	#110155	89¢
3 Com E-Link III TP Only	#105468	109¢
Maxtech 8 Port Ethernet Hub	#667901	119¢
3 Com E-Link III		
Combo Adapter (TP, BNC, AUI)	#906622	129¢
Linksys Fast Ethernet 10/100 TP PCI	#118210	134¢
Intel Fast Ethernet 10/100 TP PCI	#115238	149¢
3 Com Fast Ethernet 10/100 TP PCI	#673113	179¢
Linksys 16 Port Ethernet Hub	#626972	299¢
HP JetDirect Ethernet		
10 BT Internal Print Server	#323064	319¢

Notebook Cases

Targus Notepad Case	#251173	39¢
Kensington Compact Case	#998425	49¢
Kensington Deluxe Case	#998243	79¢
Targus Universal Case	#992001	69¢
Kensington Executive Case	#998403	99¢
Targus Leather Case	#998572	99¢

Scanners

Compaq Scanner/Keyboard	#115844	349¢
Muskeg Paragon 600 II SP	#110516	399¢
Logitech PageScan Color	#108520	399¢
Muskeg Paragon 1200 SP	#113269	699¢
HP Scanjet 4C	#108037	999¢

CD-ROM Drives

8X Blaster CD-ROM Kit	#119745	249¢
8X Discovery CD-ROM Kit	#119744	379¢
8X Performance Kit	#119743	449¢

Entertainment Software

Command & Conquer Mission Disk DOS CD	#118422	149¢
3D Ultra Pinball DOS CD	#108899	39¢
Warcraft 2 DOS CD	#112388	39¢
MS Flight Sim 5.1 DOS CD	#674443	44¢
Myst Windows® DOS CD	#288780	44¢
Rebel Assault 2 DOS CD	#112385	44¢
Command & Conquer DOS CD	#601922	49¢
Ripper DOS CD	#114346	49¢
Top Gun DOS CD	#112399	49¢
Wing Commander IV DOS CD	#112625	49¢
Spycraft Windows®95/3.1/DOS CD	#111906	49¢
Zork Nemesis Windows®95/3.1/DOS CD	#116216	54¢

Windows®95 Software

Eudora Pro V2.2 Windows®95/3.1	#116495	59¢
Norton Utilities 95 Upgrade	#102108	59¢
MS Publisher Windows®95/3.5	#111335	69¢
Winfax Pro Windows®95/3.5	#109259	79¢
Powerfinder Windows®95/3.1 CD	#120866	99¢
PC Anywhere Windows®95/3.5	#114204	139¢
Lotus SmartSuite 96 Upgrade Windows®95/3.5	#112678	149¢
Visio 4.0 Windows®95/3.1 CD	#102825	149¢

Monitors

NEC C-400 14" 13.2" DMS*	#115474	299¢
NEC C-500 15" 13.8" DMS*	#117435	399¢
NEC XV15+ 15" 13.8" DMS*	#117002	499¢
NEC M500 13.8" DMS*	#120285	599¢
Nokia 447W 17" 15.7" DMS*	#109469	799¢
NEC XE21 21" 19.8" DMS*	#600734	1899¢

*Diagonal Viewable Image Size

Utility Software

Viruscan V2.0 Windows®95/3.1	#116627	39¢
Winprobe 4.0 Windows®95/3.5	#103085	39¢
Zip It Windows®95/3.1/3.5	#115800	39¢
PC-Cillin 1.0 Windows®95/3.5	#113177	49¢
Norton AntiVirus Windows®95	#102107	79¢

Video Cards

Diamond Stealth 64 Graphics Card (VL Version)	#120399	99¢
Diamond Stealth 64 Graphics Card (DCI Version)	#120400	99¢
STB 32 ISA Card	#945444	99¢
Diamond Stealth 64 Graphics Card (2 MB)	#118945	199¢
Number 9 64 Video Card (Model 771)	#102777	299¢

Order 7 days a week, 7am - 11pm CST.

CompUSA is ready to take your order... and get it to you as quickly and conveniently as possible.

Special Orders Available!

30,000 products.

Standard Delivery

For a nominal fee, we'll ship your order anywhere in the world within 5 to 7 working days. Restrictions apply.

Three-Year and Five-Year Service Plans

You can rest assured knowing that your investment is protected, and if something goes wrong, we'll come right to your doorstep.

Internet Address:

www.compusa.com

CIRCLE 025 ON READER SERVICE CARD

Technical Support Hotline

1-800-896-9393
\$2.49 per minute, first minute free.
24 Hours a day, 7 days a week.

We can answer your questions, even if your computer products were purchased somewhere else.

Fax Orders Welcome!

Fax 1-800-FAX-2212

Government Hotline

Dial 1-800-266-7872 and press 4.
GSA #GS-35F-4050D.

International Orders:

1-214-888-5770

International Fax:

1-214-888-5706



**3 YEAR
5 YEAR
SERVICE PLANS**

Call 1-800-COMP USA PHONE SERVICE MENU:

1 **2** **3** **4**

to order by mail for store or corporate sales to join our mailing list for government & education orders

COMPUSA
DIRECT
Superstore Savings Direct To You.

PC MARKETPLACE

I N D E X

Premier

The color showcase that puts the spotlight on leading-edge PC products and services.

350-369

Classified

Flexible-format display advertising: computer systems, components, software and more.

370-383

BusinessCard

A forum for innovative, hard-to-find and low cost PC hardware, software and services.

384

HARDWARE

	PREMIER	CLASSIFIED
Batteries.....		370
Boards/Components/Chips.....	351	370
370Communications.....	354	
Computer Systems.....		371
Input/Data Acquisition/Barcode/POS.....	355	372
Mass Storage Devices.....	359	
Multi-Media.....	361	
Music/Midi.....		
Networking.....	361	374
Peripherals.....	362	
Power Supplies.....		
Security.....		
Video.....		

SOFTWARE

	PREMIER	CLASSIFIED
Barcode.....		
Business Applications.....	362	374
—Single-Solution.....		
Business Utilities.....	363	
CD-ROM Titles.....	363	
Cellular Phones.....		
Communications.....	363	375

Data Entry.....		
Database.....		
Desktop Publishing.....		
Education.....	364	375
Entertainment/Games.....	363	
Financial/Accounting.....	364	
Foreign Languages/Font/Translation.....		
Graphics/Design/CAD.....	365	
—Digital Output Service.....		
Health/Fitness/Nutrition.....		
Human Resource.....		
Mailing List Management.....		
Manufacturing/Inventory.....		
Mapping/Demographic.....		
Medical/Dental.....		
Multi-Media.....	365	
Music/Midi.....		
OS/2.....		
Personal.....		
Programming Tools/Languages.....	366	
Real Estate.....		
Religion.....		

Scientific/Engineering.....		
Security.....		375
Shareware/Public Domain.....	366	
Statistical/Research.....		
Utilities.....		
Windows.....	366	
Adult.....		380

SERVICES

	PREMIER	CLASSIFIED
Computer Insurance.....		377
Data Conversion/Data Recovery.....		377
Desktop Publishing.....		
On-Line.....	366	
Scanning Services.....		
Software Duplication.....		378
Training/Tutorial.....		

MISCELLANEOUS

	PREMIER	CLASSIFIED
Accessories.....		380
Books/Catalogs.....		
Business Opportunities.....		
Career Opportunities.....		
Supplies.....		380

Windows 95 without the risk!

System Commander

System Commander makes it safe and easy to add as many OSes to your PC as you want!

Installing a new OS usually leaves your current OS unusable. Win 95 goes a step further and is unusually predatory. System Commander helps protect your existing OS from the new OS.

Easy Installation System Commander's automatic installation will have your PC ready to add new operating systems in minutes.

After installing System Commander, your first reboot brings up a menu of the OSes already installed. Select the one you want and System Commander does the rest. Want to use another? Just reboot and make another selection.

Saves \$\$\$ Instead of investing thousands of dollars in new PCs, System Commander



makes it safe and easy to have as many as 100 different OSes on a single PC.

Boot from any combination of hard drives, any size and type of drive. Put up to 32 operating systems in a single DOS partition and/or put each OS in its own primary or logical partition. System Commander can handle any Intel compatible OS, in English or any other language, and any combination of operating systems!

Now you can experience exciting new OSes like Win 95 and OS/2 Warp without the risk!

System Commander is only \$99.95 and comes with an unconditional, 60 day money back guarantee. Get **Free** overnight shipping when you mention this ad.* Order it now and have it on your desk tomorrow morning!

"Yes, here's what you've been looking for. The product is System Commander... Highly recommended"
John C. Dvorak



Free
overnight shipping*
When you mention this ad.

V Communications, Inc.
4320 Stevens Creek Blvd., #120-2PCM
San Jose, CA 95129
r. 408-296-4224; fax 408-296-4441

800-648-8266
www.v-com.com

*When ordered before noon PST. No Saturday delivery. Standard shipping outside U.S. CA res. add \$7.25 sales tax. Offer subject to change without notice. All logos and product names are trademarks of their respective companies. VISA/MC/Amex © 1996



MICRO-ASSIST

Call TOLL FREE 888-97-MICRO

\$9.25
SHIPPING

Discover the Best discover Micro-Assist Best Prices • Products and Service = The Best Value

MOTHERBOARD UPGRADES

SIMMS

MULTIMEDIA SYSTEMS

CPU'S

All Memory and CPUs are tested previous to shipment to insure Quality

Lifetime Warranty

Are you speed-dies notice

Model	Price	Cache	Bus Voltage	Bus Speed	With Voltage Regulator
AMD 486					
DX4 100	59	3v	3.3V	33MHz	95=5v
DX4 120	69	3v	3.3V	40MHz	111=5v
DX4 133	79	3v	3.3V	33MHz	131 5v
Intel 486					
DX2 66	69	5v	3.3V	33MHz	N/A
DX4 100	100	5v	3.3V	33MHz	N/A
Pentium®					
75MHz	105				
90MHz	125				
100MHz	155				
120MHz	215				
133MHz	295				
150MHz	395				
166MHz	545				
200MHz	695				
Pentium Pro®					
150MHz	615				
160MHz	835				
200MHz	945				

VOLTAGE REGULATOR

Run the new 3v CPU's on your old 5v Motherboards

\$46.00

Model	Price	Cache	Bus Voltage	Bus Speed	With Voltage Regulator
4 MB					
1x32	\$55				
1x32	\$60				
1x36	\$75				
8 MB					
2x32	\$115				
2x32	\$119				
2x36	\$135				
16 MB					
4x32	\$269				
4x32	\$225				
4x36	\$275				
32 MB					
8x32	\$525				
8x32	\$475				
8x36	\$539				

SIMMVERTER™ '32"

Allows you to use 4-10 pin Simms (x9 or x3) on 1-72 pin Simm Sockets (x12 or x36)

SIMMSTACK™ '45"

Allows you to use 2-72 pin Simms (x32 or x36) on 1-72 pin Simm Sockets

Pipeline Burst Cache Upgrade '15 for Pentium® Motherboards 256K (512K \$59)

MOTHERBOARDS

All CPU's and Memory may be installed and tested on motherboards for \$20. All MB's have E-IDE Floppy io Controllers

Model No.	Price	Cache Size	Cache Type	PCI Slots	ISA Slots	72 Pin	Chipset	BIOS	Manufacturer
MB486PCI	\$115	256K	L2	3	4	4	ALI	AMI	Sercurity

Pentium

All Pentium® 75MHz to 200MHz CPU's are 7 Socket, have 273 Pins, and can be used with these boards. When using Pipeline Burst or Synchronized Cache you can use EDO Memory

Model No.	Price	Cache Size	Cache Type	PCI Slots	ISA Slots	72 Pin	Chipset	BIOS	Manufacturer
MBSerenity	\$155	512K	Cache	3	4	4	Intel	Award	Sercurity
MBTranquility	\$199	512K	Cache	3	4	4	Intel	AMI	Sercurity
MBP55CMS-256	\$225	512K	Cache	4	4	4	Intel	AMI	Super Micro
Super P55T25-256	\$275	512K	Cache	4	4	4	Intel	AMI	Super Micro
MBP55CMS-512	\$255	512K	Cache	4	4	4	Intel	AMI	Super Micro
Super P55T25-512	\$295	512K	Cache	4	4	4	Intel	AMI	Super Micro
MBNDEAVOR	\$225	512K	Cache	4	4	4	Intel	AMI	Intel
MBATANTIS	\$319	512K	Cache	4	4	4	Intel	AMI	Intel

Pentium Pro

All Pentium Pro CPU's are 8 socket and have 385 pins. These should only be used in a Network Environment

Model No.	Price	Cache Size	Cache Type	PCI Slots	ISA Slots	72 Pin	Chipset	BIOS	Manufacturer
MBAURORA	\$985	on cpu	on cpu	4	4	4	Intel	AMI	Intel
MBP6DOF	\$1600	on cpu	on cpu	4	4	4	Intel	AMI	Super Micro

EarthLink Network

ExpressNet Suite™ \$59.99 with Netscape Navigator™ 2.0

Includes Full Version Software • Free Internet Access from EarthLink Network™ • EarthLink Network Total Access™ Software • SurfWatch™ Parental Control Software

Minimum 1 year contract. A price guarantee is provided. No cash back. A refund will be provided if the product is not used within 30 days of purchase. All returns are subject to a 15% restocking fee. All returns are subject to a 15% restocking fee. All returns are subject to a 15% restocking fee.

CIRCLE 752 ON READER SERVICE CARD

Simmsaver

Memory Solutions

Simmsaver Technology, Inc. (STI), maker of the Patent Pending Simmsaver memory adapters for PCs, Pentiums, and PowerPCs, now offers the highly-rated PRINCETON line of memory modules to end-users at competitive pricing levels! Each module is quality inspected, rigorously tested, and warranted by a Lifetime Guarantee!

Available in 30-pin, 72-pin, and 168-pin, from 1MB up to 128MB, and in EDO. Call for pricing.

1-800-636-7281

Tel: (316) 264-2244 • Fax: (316) 264-4445
http://www.solgate.com/sti
E-mail: simmsaver@solgate.com

CIRCLE 753 ON READER SERVICE CARD

SIMMSTACK

Convert 30-pin SIMMs to 72-pin SIMMs. Add 72-pin SIMM slots to your system.

Plug & Play installation
186, Pentium & Mac compatible
Totally transparent
Will fit virtually all systems
On board logic ICs
Each adaptor individually tested
Lifetime hardware warranty

800-209-7126
http://www.simmstack.com

Made in U.S.A. Manufactured since 1992

CIRCLE 754 ON READER SERVICE CARD

International Inquiries Please Call: (714) 572-8292

24 Hour Fax Line: (714) 572-8051

Corporate, Educational, and Governmental P.O.'s Welcomed!

CALL FOR OUR NEW FREE CATALOG!

PC Systems DESIGN

PROVIDING QUALITY COMPUTER SOLUTIONS

Buy From The
Systems And Peripheral
Specialist!

1-800-833-0128

NOTEBOOKS

TOSHIBA

Sal Pro T1000CT - P75, 80486, 16.4" DS \$1999
Sal Pro T1000CT - P75, 80486, 16.4" DS \$2049
Tosca T800CT - P133, 16.4" DS, 11.3" TFT \$499
Tosca T800CT - P133, 16.4" DS, 11.3" TFT \$499

NEC

Verac 4000 - P75, 80486, 16.1" VGA TFT \$3075
Verac 4000 - P75, 80486, 16.1" VGA TFT \$3075
Verac 4000 - P75, 80486, 16.1" VGA TFT \$3075
Verac 4000 - P75, 80486, 16.1" VGA TFT \$3075

IBM

ThinkPad 700C - P75, 80486, 12.1" TFT \$6349
ThinkPad 700C - P75, 80486, 12.1" TFT \$6349
ThinkPad 700C - P75, 80486, 12.1" TFT \$6349
ThinkPad 700C - P75, 80486, 12.1" TFT \$6349

HP

Compaq 5000CT - P75, 80486, 16.4" DS \$2775
Compaq 5000CT - P75, 80486, 16.4" DS \$2775
Compaq 5000CT - P75, 80486, 16.4" DS \$2775
Compaq 5000CT - P75, 80486, 16.4" DS \$2775

ZENITH

2-Mile GT - P75, 80486, 11.3" DS \$3489
2-Mile GT - P75, 80486, 11.3" DS \$3489
2-Mile GT - P75, 80486, 11.3" DS \$3489
2-Mile GT - P75, 80486, 11.3" DS \$3489

DESK TOPS

COMPAQ

Presario 5500 - P75, 80486, 19.3" 14" \$1999
Presario 5500 - P75, 80486, 19.3" 14" \$1999
Presario 5500 - P75, 80486, 19.3" 14" \$1999
Presario 5500 - P75, 80486, 19.3" 14" \$1999

NEC

MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419

HP

Traker 350 Parallel \$189
Traker 350 Parallel \$189
Traker 350 Parallel \$189
Traker 350 Parallel \$189

IBM

Model 5000 - P75, 80486, 16.4" DS \$3849
Model 5000 - P75, 80486, 16.4" DS \$3849
Model 5000 - P75, 80486, 16.4" DS \$3849
Model 5000 - P75, 80486, 16.4" DS \$3849

HP

Compaq 5000CT - P75, 80486, 16.4" DS \$2775
Compaq 5000CT - P75, 80486, 16.4" DS \$2775
Compaq 5000CT - P75, 80486, 16.4" DS \$2775
Compaq 5000CT - P75, 80486, 16.4" DS \$2775

ZENITH

2-Mile GT - P75, 80486, 11.3" DS \$3489
2-Mile GT - P75, 80486, 11.3" DS \$3489
2-Mile GT - P75, 80486, 11.3" DS \$3489
2-Mile GT - P75, 80486, 11.3" DS \$3489

MONITORS

SONY

MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419

NEC

MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419

HP

Traker 350 Parallel \$189
Traker 350 Parallel \$189
Traker 350 Parallel \$189
Traker 350 Parallel \$189

IBM

Model 5000 - P75, 80486, 16.4" DS \$3849
Model 5000 - P75, 80486, 16.4" DS \$3849
Model 5000 - P75, 80486, 16.4" DS \$3849
Model 5000 - P75, 80486, 16.4" DS \$3849

HP

Compaq 5000CT - P75, 80486, 16.4" DS \$2775
Compaq 5000CT - P75, 80486, 16.4" DS \$2775
Compaq 5000CT - P75, 80486, 16.4" DS \$2775
Compaq 5000CT - P75, 80486, 16.4" DS \$2775

ZENITH

2-Mile GT - P75, 80486, 11.3" DS \$3489
2-Mile GT - P75, 80486, 11.3" DS \$3489
2-Mile GT - P75, 80486, 11.3" DS \$3489
2-Mile GT - P75, 80486, 11.3" DS \$3489

PRINTERS

HP

DeskJet 850C - Inkjet, 80486, 11.3" \$479
DeskJet 850C - Inkjet, 80486, 11.3" \$479
DeskJet 850C - Inkjet, 80486, 11.3" \$479
DeskJet 850C - Inkjet, 80486, 11.3" \$479

NEC

MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419

HP

Traker 350 Parallel \$189
Traker 350 Parallel \$189
Traker 350 Parallel \$189
Traker 350 Parallel \$189

IBM

Model 5000 - P75, 80486, 16.4" DS \$3849
Model 5000 - P75, 80486, 16.4" DS \$3849
Model 5000 - P75, 80486, 16.4" DS \$3849
Model 5000 - P75, 80486, 16.4" DS \$3849

HP

Compaq 5000CT - P75, 80486, 16.4" DS \$2775
Compaq 5000CT - P75, 80486, 16.4" DS \$2775
Compaq 5000CT - P75, 80486, 16.4" DS \$2775
Compaq 5000CT - P75, 80486, 16.4" DS \$2775

ZENITH

2-Mile GT - P75, 80486, 11.3" DS \$3489
2-Mile GT - P75, 80486, 11.3" DS \$3489
2-Mile GT - P75, 80486, 11.3" DS \$3489
2-Mile GT - P75, 80486, 11.3" DS \$3489

SCANNERS

NEC

MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419

NEC

MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419
MultiSync 1555 - P75, 80486, 15.5" 14" \$419

HP

Traker 350 Parallel \$189
Traker 350 Parallel \$189
Traker 350 Parallel \$189
Traker 350 Parallel \$189

IBM

Model 5000 - P75, 80486, 16.4" DS \$3849
Model 5000 - P75, 80486, 16.4" DS \$3849
Model 5000 - P75, 80486, 16.4" DS \$3849
Model 5000 - P75, 80486, 16.4" DS \$3849

HP

Compaq 5000CT - P75, 80486, 16.4" DS \$2775
Compaq 5000CT - P75, 80486, 16.4" DS \$2775
Compaq 5000CT - P75, 80486, 16.4" DS \$2775
Compaq 5000CT - P75, 80486, 16.4" DS \$2775

ZENITH

2-Mile GT - P75, 80486, 11.3" DS \$3489
2-Mile GT - P75, 80486, 11.3" DS \$3489
2-Mile GT - P75, 80486, 11.3" DS \$3489
2-Mile GT - P75, 80486, 11.3" DS \$3489

STORAGE / RAM

Western Digital

1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199

Maxtor

1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199

Maxtor

1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199

Maxtor

1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199

Maxtor

1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199

Maxtor

1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199
1.2GB IDE 12m 1/2 yr \$199

© 1995 Advanced Interlink Corporation. All rights reserved. PC Systems Design is not responsible for any typographical errors.

CIRCLE 755 ON READER SERVICE CARD

We've taken
computer
design
out of the
Stone-Age

KNS, the world's first TRUE keyboard computer

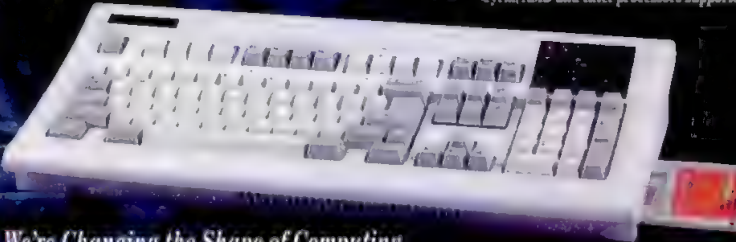
Primitive design chooses to house a tiny microprocessor inside a bulky case. With desk space being a rare commodity these days, why put up with such stone-age packaging? Cut the clutter with the Keyboard Network Station (KNS) from Advanced Interlink Corporation.

We're changing the shape of computing by packing technologically advanced components inside a keyboard! This logical evolution of the PC doesn't sacrifice performance for size. The KNS is a compact powerhouse that houses a 80486DX microprocessor*, up to 32 megabytes of RAM, super VGA adapter, 2.5" hard drive, built in 3.5" floppy drive, optional on-board Ethernet, two serial ports, one parallel port, standard 16 bit expansion slot, optional barcode reader and external 5.25" floppy port. Its impressive list of features and advanced engineering makes the KNS your missing link to performance computing.

On-board Ethernet connectors with a choice of thin coax or twisted-pair cables and a data transfer rate of 10Mbps makes the KNS a smart addition to any new or existing network. The KNS is fully tested and compatible with Novell Netware, Windows and DOS environments.

To find out more about the KNS (Keyboard Network Station), give us a call and let us show you how we have taken computer design out of the stone-age.

*Cyrix, AMD and Intel processors supported



We're Changing the Shape of Computing

15181 SPRINGDALE STREET • HUNTINGTON BEACH, CA 92649 • PHONE (714) 894-1675 • FAX (714) 893-1546

© 1995 ADVANCED INTERLINK CORPORATION. Design and specifications subject to change without notice. Trademarks are the property of their respective companies.

CIRCLE 756 ON READER SERVICE CARD

IBM Value Point/PS-1 UPGRADES

We Have The MOTHER of All Upgrades.

nova

Pentium Motherboards

- | | |
|-------------|---|
| PROCESSOR | -Intel Pentium P54C-75/95/100/120/133MHZ |
| CORE LOGIC | -Si 5511/5512/5513 |
| MAIN MEMORY | -Up to 512 MB EDO RAM supported |
| CACHE | -256k/512k/1MB WB or WT Pipelined burst RAM |
| VGA | -ATI MACH64(264CT) Integrated PCI Graphics |

(800) 554-5433

<http://www.pc.wise.com>



Local **(770) 426-8686**

Fax **(770) 426-8747**

CIRCLE 761 ON READER SERVICE CARD

SIMMulator™

30PIN TO 72PIN ADAPTOR BOARD
USE YOUR 30PIN SIMMS IN A 72PIN MOTHERBOARD!

ONLY \$25

- 100% Windows 95 compatible
- 100% Pentium compatible
- Only SIMMulator uses "EG" technology for maximum reliability
- Don't settle for cheap imitations
- Ask for SIMMulator by name

1-800-437-4066

Dealer and Distributor inquiries welcome
CDBIT: incoun@aol.com <http://www.pc.com/secom>

MSA-102 61
Birmingham, AL
Ph: 402-437-5797
Fax: 402-437-5900

CIRCLE 762 ON READER SERVICE CARD

THE FINEST PC CIRCUIT BOARDS



HSB MS5120PC Series 64-Bit PCI Bus MainBoard

INNOVATIVE PRODUCTS...

- HSB 486/5X86 PCI, On-Board EIDE, 256KCC, AMI WinBIOS\$CALL
- HSB Pentium® Processor-Based PCI MB, On-Board EIDE, 256KCC, AMI PnP FLASH WinBIOS\$CALL
- HSB Pentium® Processor-Based PCI MB, On-Board EIDE/Video, 256KCC, AMI Flash BIOS\$CALL
- HSB PentiumPro® Processor-Based PCI MB, On-Board EIDE, 256KCC, AMI PnP FLASH WinBIOS\$CALL

Pentium and Pentium Pro are registered trademarks of Intel Corporation

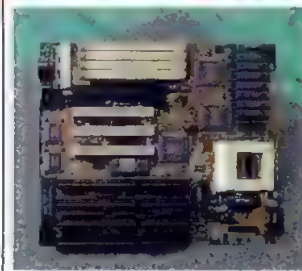
HSB
COMPUTER
LABORATORIES

the nations largest full-line PC circuit board specific manufacturer and distributor caters to individuals and businesses interested in only the finest hardware and service at the best price, provided by a long term, financially stable company. For nearly a decade, we at HSB have earned our standing as the most reputable circuit board manufacturer & distributor in the industry. Don't make the mistake of buying 'Throw-Away' circuit boards from a company without any long term commitment to your satisfaction. If we sound like what you are looking for, please give us a call at

CUSTOMER SATISFACTION

- A comprehensive 72 hour burn-in. We will not ship any board that does not perform flawlessly.
- A full 3 year warranty on all HSB made circuit boards, covering 100% of both parts and labor.
- A limited lifetime warranty on all 45ns 'Turbo' SIMM memory modules and all PGA CPU's.
- A 60-day money-back guarantee. Ensuring that you can't find a better circuit board value.
- Please call anytime for a free, full color, wholesale circuit board product guide.

(800) 497-0401



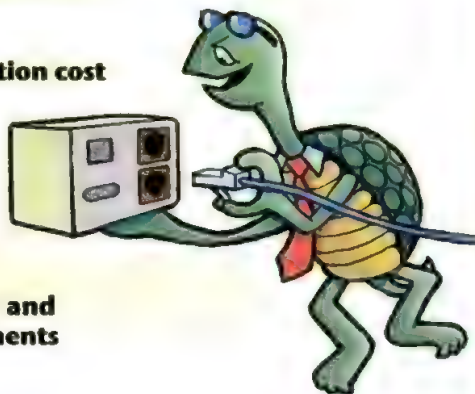
HSB MS5118PC Series 64-Bit PCI Bus MainBoard

[Local] 216-498-1356 [Fax] 216-498-1374, 34208 Aurora Road #297, Cleveland, OH 44139

Operating your PC up to 300 Feet Away is a SNAP!



- Locate your keyboard, monitor and PS/2 mouse up to 300 feet away from your computer
- Uses two Category 5 UTP cables for lower installation cost
- Works with PC, PC/XT, PC/AT, PS/2 and 100% compatibles
- Supports up to 1024 x 768 non-interlaced resolution
- Keep your PC in a secure, climate-controlled area and maintain access from crowded or harsh environments



PC EXTENDER

Cybox and Extender are trademarks of Cybox Computer Products Corporation. PC, PC/XT, PC/AT, and PS/2 are registered trademarks of International Business Machines Corporation. The Inc. 500 logo is a registered trademark of Goldhrish Group, Inc.

Cybox Computer Products Corporation
4912 Research Drive Huntsville, AL 35805 USA
1-800-932-9239 (205) 430-4030 fax
<http://www.cybox.com/>



SEE US AT PC EXPO, JUNE 18-20
BOOTH #4934

SEE US AT NETWORKS UK,
BIRMINGHAM, UK, JUNE 25-27
BOOTH #E82



CIRCLE 764 ON READER SERVICE CARD

Lose 500 pounds in 10 minutes

with a Rose keyboard monitor switch

Call today for free catalog

- ◆ Print servers
- ◆ Data switches
- ◆ Keyboard/video control

800-333-9343

Spring Comdex - Chicago ILL - Booth #C5129
PC Expo - New York City - Booth#2221
P.O. Box 742571 ♦ HOUSTON, TEXAS 77274
TEL 713/933-7673 ♦ FAX 713/933-0044

Streamline your computer room by reducing excess equipment. Access up to 256 CPU's from a single keyboard, monitor, and mouse. ServeView is our best-selling switch, has every feature you can imagine, and installs in minutes. Compare price, features, performance, quality, and support and you'll find Rose can't be beat.

Call us to discuss your application
or to receive your free information kit.

ROSE
ELECTRONICS

CIRCLE 765 ON READER SERVICE CARD

YOU CAN REACH THE WORLD BUT CAN THE WORLD REACH YOU?

PC-BASED VOICE MAIL
&
CALL PROCESSING SYSTEMS

1-800-934-4884

TALKING TECHNOLOGY, INC.
1125 ATLANTIC AVE. ALAMEDA, CA.94501
VOICE: 510-522-3300 FAX: 510-522-5556

CIRCLE 766 ON READER SERVICE CARD

USE 2 MICE

Switch instantly between two pointing devices, like two mice, or a mouse and trackball, with the *WhyMouse* Dual Mouse Adapter

\$39.95
FREE SHIP

WhyMouse

- Automatically gives cursor command to active device.
- No software needed, just plug it in.
- The perfect solution for meetings, multi-user work stations, teaching, anywhere one mouse isn't enough.

P.I. Engineering, Inc.
For more info or to Order Call:
1-800-628-3185

HOURS
M-SAT 9-5 EST

220 Washington Rd., Wallingford, CT 06495

PC To TV Conversion

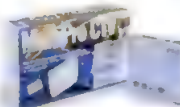
Make the ultimate multimedia connection - PC to television! Display your computer output on a TV or record it on video tape.

REACH A LARGER
AUDIENCE BY
RECORDING YOUR
PRESENTATIONS
ON VIDEO TAPE

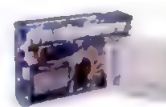
DISPLAY YOUR
PRESENTATIONS
ON A GIANT
SCREEN TV

IN PHASE
THE ENTERTAINMENT
PLAY TO GAME
ON TV

External VGA to TV/Video Converters by AiTech



MultiPro CTV



PCTV-1108



PSC-1106

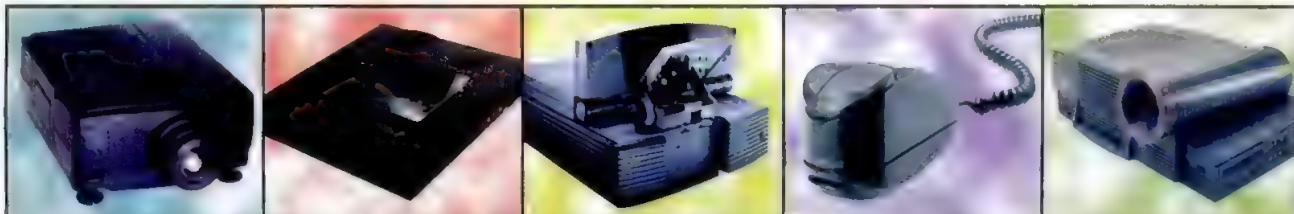
To order or get more information call **1-800-882-8184**

AiTech
Vision for Multimedia

Internet e-mail: sales@aitech.com
www page: <http://www.aitech.com>

CIRCLE 768 ON READER SERVICE CARD

IF WE DON'T SELL IT, IT'S NOT WORTH LOOKING AT.



PANELIGHT IS YOUR ONE STOP SHOP FOR ALL LEADING BRANDS • SALES, RENTALS, & LEASES • MONEY BACK GUARANTEE.

PANELIGHT OFFERS THE BEST IN SELF-CONTAINED LCD PROJECTORS, LCD PROJECTION PANELS, SUPER-BRIGHT OVERHEADS, MULTIMEDIA MONITORS, PC-TO-TV CONVERTERS AND ACCESSORIES FROM THE WORLD'S LEADING MANUFACTURERS SUCH AS HITACHI, IN FOCUS, PROXIMA, NEC, NVIEW, POLAROID AND OTHERS.



CALL THE EXPERTS AT
PANELIGHT DISPLAY SYSTEMS, INC.

IT'S OUR BUSINESS TO ENSURE THAT YOUR BIG IDEAS GET THE ATTENTION THEY DESERVE — NO MATTER WHAT THE VENUE. WE ACTUALLY KNOW AND SELL THE LEADING BRANDS. WE CAN RECOMMEND WHAT FITS YOUR SPECIFIC NEEDS.

CALL NOW FOR OUR FREE, HIGHLY INFORMATIVE CATALOG OF PC VGA/SVGA, MAC, VIDEO, AND WORKSTATION SOLUTIONS. MOST PRODUCTS CAN BE DELIVERED OVERNIGHT, AND COME WITH A MONEY-BACK GUARANTEE. SO, WHY LOOK ANYWHERE ELSE?

CALL PANELIGHT TODAY!

CALL
PANELIGHT FOR
OUR
FREE CATALOG:
1-800-726-3599.

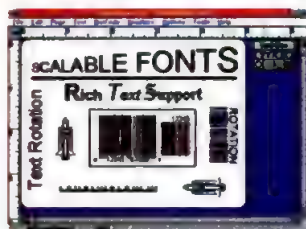
MON.-FRI., 6:30AM-5:30PM P.S.T.
24-HR. FAX: 415-986-3817

PANELIGHT DISPLAY SYSTEMS, INC.,
P.O. BOX 190840,
SAN FRANCISCO, CA 94119.
CALL 415-772-8800
OR E-MAIL PANELIGHT@EMP.NET

CIRCLE 806 ON READER SERVICE CARD

The Next Generation in Label Design Software

LabelWorks™ for Windows



LabelWorks sets the new performance standard for professional quality label design. No other program combines such easy operation with this much power!

- Provides Desktop Publishing features to enhance label design. Features include: WYSIWYG, rulers, guides, page zooms, lines, shapes.
- Rich text support allows you to edit font styles, types, and sizes within the same line.
- Supports all major Bar Code symbologies, including Code 39, 93, 128, POSTNET, UPC, Bookland EAN, 19 types in all.
- Imports & Exports using TIFF, GIF, BMP, PCX, WPG, WMF, TARGA graphic files.
- Rotates Text, Bar Codes and imported graphics in 90 degree increments.
- Prints labels on virtually any windows supported printer.
- Prints labels directly from dBase, DIF & ASCII files.

Dealer Inquiries Welcome.

Call for Free DEMO Software



AMERICAN MICROSYSTEMS

2190 Regal Parkway, Euless, TX 76040

(800) 648-4452 (817) 571-9015 FAX (817) 685-6232

"Boxlight is your reliable source
for electronic presentation rentals!"



Whether you need multimedia, high-resolution, incredible brightness or lightweight portability, we've got the right tools to make your ideas shine!

Rental fee applies towards purchase of ANY system within 30 days

Convenient "Label & Leave" Pick-up Service

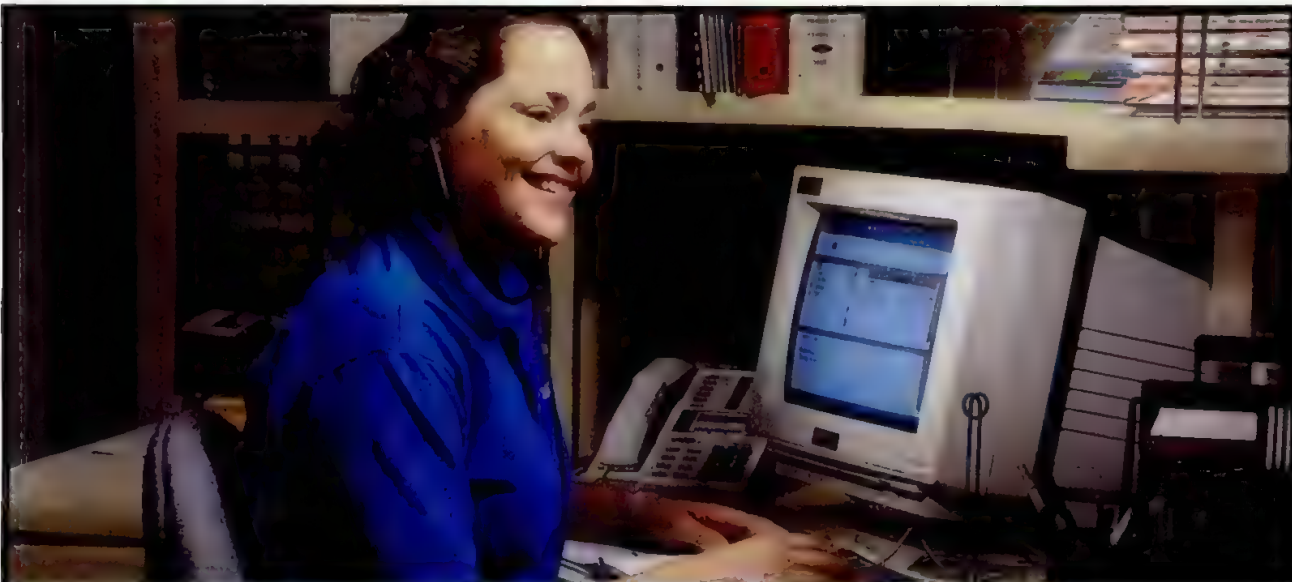
Every system tested for Guaranteed Performance!

Call Today and
Project Tomorrow!

1-800-736-0751

BOXLIGHT
CORPORATION

CIRCLE 789 ON READER SERVICE CARD



"Boxlight sells more electronic projection systems to more people than anyone. Call to find out why."



ONLY \$3,999

ColorShow™ 2000+

The first, and still the only TFT active-matrix projector you can buy for under \$4,000!

- Sleek, compact & stylish design
- Less than 20 lbs. travel weight
- Includes free remote control
- Unbeatable performance value

Beacon™ 2500



\$6,499

500 Lumens!

The new standard for brightness and value in conference room LCD projectors!

- True 500 ANSI Lumens!
- Auditorium or full room light use
- Remote power Zoom and Focus
- 2 PC inputs, 2 video, 4 audio
- Biggest, brightest image anywhere!

#1 For Rentals



Call for special price!

ProColor™ 3080

A bright, compact projector with superior color and clarity, use even in normally lit rooms.

- Mac or PC, Video plus Audio
- Only 16 lbs. travel weight
- Clarity sharp as 35 mm slides

ProColor™ 1301



Limited Time! **\$1,999**

TFT Active Matrix Color for under \$2,000!

- Save \$1,000 on our Best Seller!
- Lightweight, reliable, rugged design
- Mac or PC, optional video and audio
- Easy-menu, zoom, freeze, pointer

ProColor™ 1701



\$5,999

The most economical high resolution projection panel available

- True 1024 x 768
- TFT active-matrix
- PC, Mac & Workstations

As the most trusted name in Presentation Electronics, we offer:

- Dialog with knowledgeable people who really help
- More than 50 models to choose from, available now
- Overnight shipping to multiple world-wide locations
- Money-back 30-day guarantee
- Free lifetime tech support

Monday through Friday, 6am-5pm, Pacific time. Purchase orders accepted
*some restrictions. Prices subject to change. Quantities may be limited to stock on hand

Call BOXLIGHT today 1-800-762-5757 **BOXLIGHT™**
DIRECT

Government: (800) 497-4009
Resellers: (800) 736-6956
International: (360) 779-7901

Rental: (800) 736-6954
Fax: (360) 779-3299
Education: (800) 689-6676

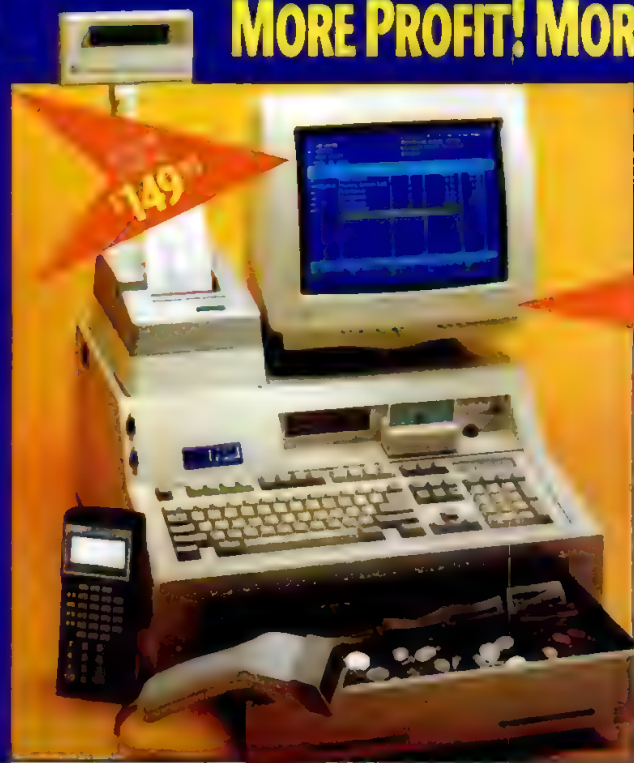


<http://www.boxlight.com>

MORE PROFIT! MORE SALES! MORE CUSTOMERS!

Save Time, Reduce Theft,
Speed Checkout
with

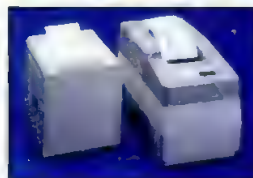
The General Store Retail Management System



Since 1983, The General Store has been the system of choice by thousands of retail and chain stores nationwide. Known for its ease of use, flexibility, and lightning speed, The General Store is ideal for most retail environments. At \$149.95, The General Store starter kit offers over 250 of the most desired point of sale features. A clerk can learn to use it in minutes. Your customers are processed in seconds.



PC AMERICA
HARDWARE SOLUTIONS



Flexible Enough for Any Business

apparel/clothing/shoe
appliance
art gallery
automotive/tires
beauty salon/supply
bicycle/motorcycle
book
bridal and tuxedo
card shop/gift shop
computer
convenience/fast food
dry cleaner
eyeglasses
florist
furniture
gas station
sporting goods/golf/gun
grocery/bakery
hardware/locksmith
health/fitness center
journalist supply
lawn and garden
jewelry
liquor
mail order
marine supply
music/record and tape
nail salon
office supply/stationery
pet
pharmacy
photography
plumbing & heating
specialty stores
toy/hobby
sports cards/uniform
...and YOUR STORE!

Increase your profits by more than 25%

Computerization pays for itself, saving you thousands of dollars, giving you peace of mind, and making the best use of your time. The General Store, with over 250 of the most desired point of sale features, will help you leapfrog past your competition by controlling costs, reducing errors and increasing efficiency.

✓ **Quicker Checkout**-barcode scanning (50% faster than a cash register), instantaneous no wait receipt printing system, automatic credit card verification, split tender, product lookup by any word, new items added at POS

✓ **Increased Accuracy**-100% accurate built-in barcode scanning and printing, instant price lookup, price quotes, serial number tracking, multiple pricing levels, multi-unit pricing (i.e. 3/\$1.00)

✓ **Reduced Theft**-cash register reconciliation, salesperson tracking, password protection, pole display sale verification, accurate inventory tracking

✓ **Cost Reductions**-real time inventory control, dynamic update of item sales and inventory data, reorder point alarms, extensive reporting capabilities, multi vendor P.O. selection (5 vendors per item)

✓ **Better Business Decisions**-detailed reports and financial statements showing the status of your business, charge account credit limit checking, parts explosion for kits tracks every inventory item, built-in general ledger, accounts receivable and accounts payable

✓ **Better Customer Service**-customer purchase history, complete layaway, mail list management, instant customer lookup, multiple price level support by category of customer

✓ **Unique Features**-powerful size/ color matrix for clothing and shoe stores, electronic scale compatibility, convenience store/gas station pump compatible, supports 99 work stations per store, multi-store ready, FREE file conversions from 32 other POS systems

FREE!

Take a
FREE 30-day
General Store
Test Drive
(call now for
details)

PC AMERICA PRICE LIST

Using another
P.O.S. system?
Call for
**SPECIAL
COMPETITIVE
UPGRADE
PRICE!!!!**

**DEALERS
WANTED!**

Join our new dealer
program. It's **FREE**. It's
the fastest way to make
money...AND we make it
EASY. Call now for details.

The General Store Professional
Edition (single user, multisite
ready)..... \$995.00
The General Store Network
Edition (multisite ready)
..... \$1,495.95
The General Store Starter Kit
(abridged version)..... \$149.95
Cash Drawer \$199.00*
Citizen Receipt Printer
..... \$299.95*
Pole Display \$299.00*
CCD Bar Code Reader \$399.00*
Laser Bar Code Scanner
..... \$429.00*

* Call for Competitive Prices

1-800-PC-AMERICA

Call Toll Free 1-800-722-6374

Phone: 914-267-3500

PC America
60 N. Harrison Ave.
Congers, NY 10920

Fax: 914-267-3550

CIRCLE 787 ON READER SERVICE CARD

AIWA has a full line of tape drives to fit you to a T.



Whether you're an individual with a personal computer, a large multi-office corporation with extensive networking needs, or anything in between, AIWA has the tape drive that's just your size.

QIC-3010 Travan Tape Drive for PCs or single workstations.

AIWA meets the increasing need of home computer users to back up their data at an affordable cost. For both internal and external applications, this tape drive supports the latest Travan technology, conforms to the QIC-3010 format, and offers backward compatibility with other QIC products.

DDS-2 Tape Drives for small networks or power workstations.

The GD-8000 series is a family of 4mm DDS-2 tape drives providing high capacity now – plus the ability to meet your growing storage needs for years. Easily connects to any stand-alone or networked computer, file server or workstation by a standard SCSI connector.

AL-D210 and AL-D220 AutoLoaders for large networks.

Designed for all major network servers, these SCSI-based AutoLoaders completely automate nightly tape backup operations – including automatic tape insertion,

removal and tape rotation of 17 tape cartridges. Reduce administrative costs and eliminate data loss due to human error. The AIWA AutoLoader never forgets!

To find out which AIWA tape solution fits you to a T, call **1-800-920-2673**.

aiwa
Always a move ahead.

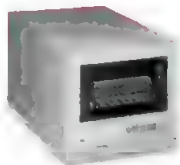
AIWA AMERICA, INC. Headquarters
800 Corporate Drive, Mahwah, NJ 07430
Tel: (201) 512-3696 Fax: (201) 512-3704

AIWA Sales Singapore
Tel: 65-276-7185
Fax: 65-276-6800

AIWA (UK) LTD.
Tel: 44-181 897 7000
Fax: 44-181 564 9446

DRIVING THE INDUSTRY

DLT (Digital Linear Tape) single drives and libraries give you high performance, high capacity and the exceptional data integrity of linear technology.



3480, 3490, 3490E solutions for all your data interchange and backup applications.

- up to 5 GB/hr native backup speeds
- up to 280 GB capacity
- compatible with a wide variety of hardware and software platforms



- Exclusive 18- & 36-track read and write in one drive with either L490E or L60E
- 10 GB/hr with fast/wide SCSI interface
- Increased storage capacity with the 60 cartridge L60E data vault



Call the leader in backup and interchange solutions today.
1-800-729-8725 or 619-571-5555

8975 Balboa Avenue, San Diego, CA 92123-1599
WWW: <http://www.ovrland.com/~ndisales>

CIRCLE 772 ON READER SERVICE CARD

DOS • WINDOWS • 95 • NT • OS/2 • UNIX



East-800-828-0599
West-800-928-9099

Headquarters—Chi Corporation
31200 Carter Street
Solon, OH 44139
216 349 8605 Fax 216 349 8609

Phoenix Office—Chi Corporation
10640 North 28th Dr., Bldg. C205 Suite 21
Phoenix, AZ 85029
602 548 9010 Fax 602 548 9041

Nine Track Tape Systems

All Densities - 800/1600/3200/6250

All Platforms

3480/3490/3490E

Single Load or 10 or 60 cartridge Libraries

DLT-4mm-8mm

Complete Network backup

Solutions—Novell, NT, Unix

Data Conversion Services

4mm, 8mm, 9trk, 3480, 3490, 3490E, EVEN TO CD

Disk RAID Systems

3GB up to 250 GB

All Platforms

CD ROM Recorders

2x/4x, 4x/4x, 6x/6x—All platforms

Chi Corporation: Manufacturers of the Award Winning OutRight and ReelView II Software

CD ROM Jukebox

For Novell or NT Software by Smart Storage

CHI 2801

28 Disk capacity with 4-4x CD ROM Readers
Plus 1 Yamaha CDR100 4x/4x Recorder/Reader
Includes all necessary software, cables, SCSI card

CHI 2100

21 Disk capacity with 3-4x CD ROM Readers
Includes all necessary software, cables, SCSI card

PC • RS6000 • AS400 • HP • SGI • SUN • DEC

CIRCLE 771 ON READER SERVICE CARD

YAMAHA 4X CDR100

UNIX
MAC
WINDOWS
OS/2
NT

CD Recorders Jukeboxes Duplicators

- CD-R Media
- Data/Audio Duplicators
- CD-R Backup/Archiving
- Cross Platform Support
- CD Rom Towers

NSM

2355 N. Steves Blvd. Ste. C-F, Flagstaff, AZ 86004
Ph: 602-396-3616 FAX: 602-396-0483

1-800-278-3480

CIRCLE 773 ON READER SERVICE CARD

9 TRACK/3480/3490/3490e

WINDOWS DOS NT NOVELL OS2

9 Track only \$995 3480 only \$4995

IBM ANSI UNIS Tar VMS Unlabeled
Conversion EBCDIC TO ASCII
Tape Backup, Duplication
Tape to CDROM
Service with a Smile

LAGUNA DATA SYSTEMS

800-938-TAPE (702) 382-3964 Fax

CIRCLE 776 ON READER SERVICE CARD

Custom Fast 20 SCSI Tools

SCSIVue Active Terminator

Benefit: Remote Cfg.

- Improves SCSI Bus Performance
- Less Errors, More Reliable Data Transfer
- Diagnoses Problems • Analyzes Signal Quality

\$59

SCSIVue Diagnostic Cables

Benefit:

- No Loss Of Important Data
- Faster Performance
- Test Cable Integrity

\$39

SCSIVue 2-1 Active SCSI Switch

Benefit:

- Active Regulation • Fast 50 & Fast Wide-bid
- Status Indication • Gold Contacts

\$39

SCSIVue Custom Tefflon Internal Cables

Benefit:

- Less Errors, Ultimate Performance
- Silver Wire Improves Signal Quality

\$39

• Perfect 90 Ohm Impedance Match • Custom in 1 Day
• Triple Pronged Connector With Gold contacts Silver Wire

Granite

CIRCLE 774 ON READER SERVICE CARD

Portable Disk Drives

World's Smallest
Internal Battery Option!

Parallel & SCSI

• New 4.2 & 2.2 Gigs
• Fast 8ms access
• Fast SCSI-2 Transfer Rates
• Over 1MB/sec thru parallel port
• No power supply "Bricks"
• Rugged aluminum for field usage
• High impact 75 G Shock
• Built in power supply, Battery option

270 MB SyQuest Removable
230 MB Optical
4x CD-ROM
1.3 Gig MO
9 Mbit/sec Envel
Any Combination
16 Gbit DAT

No Power Supply Bricks

Liberty Systems

(408) 983-1127
Fax 408-243-2885
375-A Saratoga Ave., San Jose, CA 95129

CIRCLE 777 ON READER SERVICE CARD

CIRCLE 778 ON READER SERVICE CARD

max 50.3 55.4 64.8

<http://www.tvview.com>

CIRCLE 807 ON READER SERVICE CARD

now: **Q**

**PUT YOUR AD HERE AND WRITE YOUR OWN PC
MAGAZINE SUCCESS STORY. START ADVERTISING
NOW! CALL 800-825-4237 TODAY!**

Your Computer Accessory Supersource is the low price leader.



We carry Accessories, Cables, Furniture, Multimedia and Network products



For a FREE Catalog call 408 730-0673

Computer Cafe

CIRCLE 782 ON READER SERVICE CARD

DIGITAL CAMERAS FROM \$299



Since 1988, Dycam's only business has been Digital Cameras. Today, we offer a full range of Grayscale and Color models. Call a Dycam expert to help you select the best Digital Camera for your application.

Model 10-C includes:
Power Zoom with Macro
Auto Focus & Flash
Unlimited Storage
Receipts Gloss-up
and Wideshots
Lens Adapters
Exclusive Dycam
System Software



NOT AVAILABLE IN RETAIL STORES. CALL DYCAM DIRECT AT:

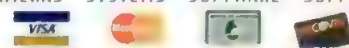
1-800-88-DYCAM

PHONE: (818) 407-3980 • FAX: (818) 407-3988

VISIT OUR WEB SITE: <http://www.dycam.com>



DYCAM—THE DIGITAL CAMERA COMPANY
CAMERAS • SYSTEMS • SOFTWARE • SUPPORT



CIRCLE 783 ON READER SERVICE CARD

KEYS • KEYBOARD TEMPLATES

Let Us Customize Your Keyboard!

Offering the widest selection of customized replacement keys to suit any keyboard make or model.

CUSTOM SERVICES
1-800-459-7931

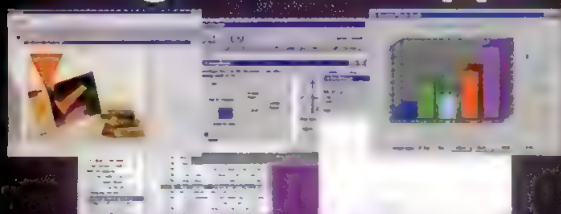
DATA CAL

...Making You More Productive

531 East Elliot Road • Chandler, AZ • 85225 • 602-813-3100 • Fax 602-545-7212

CIRCLE 784 ON READER SERVICE CARD

Plug-in Web Apps



Create a really cool Web site and plug in an extensive suite of off-the-shelf applications. With the Workgroup™ Plug-in for Netscape, launch client/server applications directly from your Web site — and deliver the supercharged interactive presence your company deserves. Download the Workgroup Plug-in from our Web site: <http://www.gcomni.com>. Call us today at 1-800-328-1128 for more information.

GCOMNI, Inc. • 4951 60th Avenue • Suite 101 • Fort Lauderdale, Florida • 33304
Phone: (954) 543-0808 • Fax: (954) 543-7944 • Email: (954) 543-7944 • Web: <http://www.gcomni.com>

No more pre-printed checks!

Save time and money printing your own checks with mips VersaCheck™!

Revolutionary mips VersaCheck™ is the inexpensive software that not only lets you print your own completely valid checks from scratch, but automatically keeps your account balances too! mips VersaCheck installs in Word for Windows and lets you create checks in minutes. Include addresses, logos, even your signature, all password protected. mips VersaCheck even prints the MICR account number for you, required by all banks for processing. Make changes any time without waiting!

Have as many accounts as you like. mips VersaCheck maintains your account balances for you, including the deposits and fees you enter. And mips VersaCheck works with all the leading accounting programs, including Quicken, Peachtree, MS Money, and more. mips VersaCheck comes with free blank forms, so you can print new checks right away!

Stop paying and waiting for pre-printed checks.

Order mips VersaCheck now!

mips
VersaCheck™ SRP \$49.95

mips

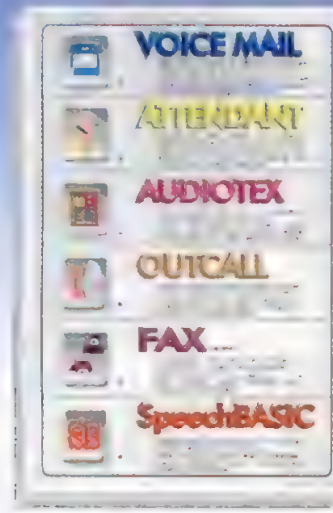
Dateline America, Inc.

Tel: 619-679-4070 Fax: 619-679-4073

13240 Evening Creek Drive, Suite 311 San Diego, CA 92128

CIRCLE 785 ON READER SERVICE CARD

SPEECH MASTER



DOES
IT
ALL

For One Low Price



SPEECHMASTER™ is the award-winning AI in the speech application solution. This isn't just a leading full featured high capacity package; it's easy to use and easy to learn. No programming required, nothing to assemble, no hidden costs, and all components working together seamlessly to provide the best in speech applications. Now with SpeechMaster™, you can make power. All this backed by our highly trained expert technical support staff to guarantee SpeechMaster works for you in any environment. SpeechMaster software is available in several configurations: a maximum of 2, 4, 8, 16, or 32 individual telephone lines in the PC communication boards. The PC boards come in two versions: 2, 4, 8, 16, or 32 physical telephone lines, and can be used in any manner to achieve the desired line capacity.

SpeechSoft, Inc.
800-878-8117



CIRCLE 786 ON READER SERVICE CARD

Only BatteryDisk™ Rescues Your PC from CMOS Battery Failure!

When your CMOS battery fails — and it will — your PC won't boot. DOS and Windows won't load. The keyboard won't respond. But now you can protect your system with BatteryDisk. In fact, when the *New York Times*, *PC World*, *Popular Science*, *Windows Magazine* and others ran articles about BatteryDisk and CMOS battery failure, our lines lit up with calls for help.

NOW ONLY
\$19.99
3.5" or 5.25"

With BatteryDisk, you don't have to be a computer genius or understand any cryptic technical computer jargon. Run the easy-to-use setup program and in just seconds, BatteryDisk records unique, vital data about your computer's hard drives (sectors, tracks and landing zone offset), CPU cache, bus speed, DMA Transfer mode and Shadow Memory Base settings. And when your CMOS battery fails, just insert BatteryDisk, turn on your PC and keep on working. BatteryDisk takes care of everything — quickly and reliably.



BatteryDisk offers safe, easy & effective CMOS battery protection for any PC running DOS, Windows or Windows 95. **BatteryDisk: the most valuable computer product you'll ever own!**

Order Now! Call 1-800-248-4217

International Systems Inc.
351 West Hubbard St., Suite 501
Chicago, IL 60610
312-222-1364 • 312-222-9226 (fax)

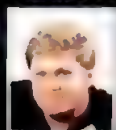
Also available at
COMPUSA
THE COMPUTER SUPERSTORE
MEDIAPLAY
VIDEO • AUDIO • BOOKS • MUSIC
MICRO CENTER
THE COMPUTER SUPERSTORE

Catch us on the net! <http://www.isi.inter.net>

CIRCLE 786 ON READER SERVICE CARD

QUALITY

“Audience quality is the reason we get more orders from our Marketplace ads. PC Magazine readers are more knowledgeable and they're decision makers who have buying authority.”



— Kelly Leopard
Principal, Total Recall, Inc.

PUT YOUR AD HERE AND WRITE YOUR OWN PC MAGAZINE SUCCESS STORY. START ADVERTISING NOW! CALL 800-825-4237 TODAY!



Walnut Creek CDROM



Order Now! • 24 hours a day!

Blackhawk '95	Latest Windows 95 shareware, utilities, app's, accessories.	\$29.95
CICA for MS Windows	3,500 Windows programs, freeware, demos, drivers, utilities.	\$29.95
Newt for Windows NT	NT shareware, utilities, programming tools, patches, etc.	\$39.95
Linux Slackware 3.0	Internet's favorite operating system. Full PC Unix. 2 discs.	\$39.95
FreeBSD 2.1	Full 4.4 BSD Lite-based 32-bit operating system. Rock stable.	\$39.95
Perl	Latest edition packed with Perl source code, docs, & more.	\$39.95
The Viper Toolkit	850 files for visual programming in Visual Basic, C/C++, etc.	\$39.95
Hobbes OS/2 Archived	OS/2 mag's product of the year! 1000 MB current shareware.	\$29.95
Command & Conquer	and Warcraft 2 Toolkit. Add-ons for these hot selling games.	\$19.95

Call about our subscription offer where \$29.95 discs are \$19.95, and \$39.95 discs are \$24.95

All our CDROMs
are **unconditionally**
guaranteed!

1-800-786-9907 <http://www.cdrom.com/>
Shipping \$5 per order/US
\$9 per order/Overseas

Phone: +1 510 674-0783 x 517 • Fax: +1 510 674-0821 • Email: orders@cdrom.com
Walnut Creek CDROM • Suite D-517, 4041 Pike Lane, Concord CA 94520, USA

CIRCLE 786 ON READER SERVICE CARD

CREATE YOUR OWN SCREEN SAVERS!

Introducing IDLE-EYES, your personalized screen saver! IDLE-EYES allows you to create your own screen savers using your favorite photographs, music, text, videos, recorded messages, even sound effects and images downloaded from the internet. Combine any image file with your favorite sound file and create an unlimited number of custom screen savers.



IDLE-EYES makes the perfect gift for anyone with an active imagination—and a PC. \$24.99 plus shipping & handling
For more information please call: (800) 696-8128
(EMAIL) sales@compunnel.com
COMPUNNEL SOFTWARE GROUP, INC.

CIRCLE 790 ON READER SERVICE CARD



Video Training for Windows Applications

KEYSTONE
LEARNING SYSTEMS CORP.



Dan Baker
Microsoft Certified Trainer
& Windows 95 Instructor

Windows 95/3.11

Beg./Int/Adv (ea) \$49.95
Special All Three \$129.95
Networking 49.95
Installation 49.95
Special Features 49.95
Special All Six \$239.95

Word 95/7.0

Beg./Int/Adv (ea) \$49.95
Special All Three \$129.95
Desktop Publishing 49.95
Mail Merge 49.95
Tables & Forms 49.95
Special All Six \$239.95



Dennis Taylor
Microsoft Excel Specialist
& Excel Instructor

Excel 95/5.0

Beg./Int/Adv (ea) \$49.95
Special Features \$49.95
Project 95/4.0
Level 1/2/3/4 (ea) \$79.95

CorelDRAW 6

Beg./Int/Adv (ea) \$49.95
Special All Three \$129.95
WordPerfect 8.1
Beg./Int/Adv (ea) \$49.95

Other Videos

MS BackOffice Call
Lotus SmartSuite Call
Over 250 Titles Available
*Prices and course may vary



Microsoft Certified Developer
& Access Instructor

Developer 1-6

Beg./Int/Adv (ea) \$49.95
Special All Three \$129.95
Visual Basic 4.0
Level 1/2/3 (ea) \$89.95
Level 4/5/6 (ea) \$89.95
Special All Three \$249.95
Special All Six \$449.95

Lotus 1-2-3 and 6

Beg./Int/Adv (ea) \$49.95
Special All Three \$129.95



Average: 2 hours per video



Rob Aronson
NetWare 4.1 Instructor &
Novell CNI & EDNE

NetWare 4.1

Level 1/2/3/4 (ea) \$89.95
Level 5/6/7 (ea) \$89.95
Special All Three \$249.95
Special All Six \$449.95
3.x to 4.1 Upgrade \$49.95

Windows NT 3.5x

Installation \$89.95
NT Server Level 1 \$89.95
NT Server Level 2 \$89.95
NT Workstation \$89.95
Special All Four \$299.95

Domestic Shipping 2-3 Days
\$5.00 for the first two videos
plus \$1.50 for each additional
video tape



Special MS Office 95/4.x Video Combinations

MS Office Standard (9 videos, 17 hours) \$349.95 with KeyNotes \$469.95
MS Office Pro (13 videos, 24 hours) \$499.95 with KeyNotes \$629.95
MS Office Plus (16 videos, 29 hours) \$679.95 with KeyNotes \$799.95



Developer Power Pack Combinations

Developer Power Pack Standard (Any 9 videos)
Developer Power Pack Pro (Any 17 videos)
Developer Power Pack Plus (Any 16 videos)
Choose From: Visual Basic 4.0 • SQL Server • Access Developer • Visual C++
Visual FoxPro 3.0 • Delphi 2.0 • PowerBuilder



Special SmartSuite 96 Video Combinations

SmartSuite 96 Standard (9 videos, 17 hours) \$349.95
SmartSuite 96 Pro (13 videos, 24 hours) \$499.95
SmartSuite 96 Plus (16 videos, 29 hours) \$679.95

3 Easy Ways to Order

CALL 1-800-748-4838
801-375-8600

FAX 1-801-373-6872

MAIL KeyStone Learning Systems Corp.
2181 Larsen Parkway • Provo, UT 84606
<http://www.keystonesys.com/> AD# PM66

We accept C.O.D., Company P.O. or check.

CIRCLE 791 ON READER SERVICE CARD

BECOME A CNE...FAST!

THE FIRST CNE COMPUTER BASED TRAINING PROGRAM IS HERE...

The first 100% Computer Based Training (CBT) program to fully prepare you for Novell's CNE exams. Its innovative design provides fast, effective and convenient training to anyone wishing to become a Certified NetWare Engineer, even when hampered by a busy schedule. Our CNE CBT allows you to learn and practice everything you need for full NetWare certification.

BONUS: Now includes a full working version of Micro House Technical Library on CD-ROM!

- All on one CD
- Interactive NetWare simulation for hands-on exercises
- Study at your own pace
- Hundreds of practice questions
- Everything you need to prepare for Novell's tests!

1-800-653-4933

CIRCLE 792 ON READER SERVICE CARD

NOVELL CNE

Prepare for the Novell CNE exams with the most complete home study course available today! Covers the complete NetWare 4.x track.

CNE 4 Study Guide
CNE Update to NetWare 4.1

lanell@ktb.net
<http://www.lanell.com>
16250 Ventura Blvd. # 202, ENCINO, CA 91436 Fax: (818) 906-1292

800-526-8355

CIRCLE 793 ON READER SERVICE CARD

COMPUTER CHECKS

Laser/Inkjet
Continuous Checks and Check Savers Also Available.

As Low as \$29.95
CALL: 1-800-239-4087
FAX ORDERS: 1-800-774-1118
(PLEASE CALL FOR A FAX ORDER FORM)
MC, VISA & AMERICAN EXPRESS ACCEPTED
Internet: <http://www.hotnew.com/checks/>
E-Mail: info@checks.hotnew.com

- ✓ QUICKEN
- ✓ SIMPLY MONEY
- ✓ MICROSOFT MONEY
- ✓ MANY MORE

Laser and Continuous Feed Checks available in:

- Business Size
- Business Size with Voucher
- Wallet Size

Available in Quantities of 250, 500, 1000 and 2000.
Choose From 4 Stylish Colors!

Classic Blue Tan Classic Green Prestige

Designer CHECKS
P.O. Box 13367 • Birmingham • AL 35211

CIRCLE 794 ON READER SERVICE CARD

Factory Service

AVC Tech, Inc
Computer Monitor Service Center
 Tel: 708-588-1700
 Fax: 708-588-0411

7510 N. Caldwell Ave. • Niles IL 60714

All Brand Monitor Service Since 1978

800-283-6212

CIRCLE 796 ON READER SERVICE CARD

IMAGERS® Digital Output Center

DIGITAL OFFSET COLOR **indigo** **PRINT 1-1000 Brochures Newsletters Flyers...**

Print only what you need!

Kodak TO CP SERVICE PROVIDER **Slides & Overheads**
 4x5 8K Film Imaging
 54" Wide Color Posters
 Canon Digital Lasers
 Dye-Sub Color Prints

Pro/5B • 35mm / S.90

Great Value!
\$300 value only
 Quality Guaranteed

800-398-5816 • 404-351-5800
 1575 Northside Dr. Ste. 490 Atlanta 30318
www.imagers.com

CIRCLE 795 ON READER SERVICE CARD

TV ELITE... The Complete Presentation System!

The leader in Big Screen Presentations just got better! TV ELITE connects to any video-capable TV in just seconds and produces excellent quality VGA to TV conversion for business meetings or multimedia presentations. TV ELITE includes TV TOOLS with 65 on screen tools such as ZOOM DRAW SPOTLIGHT BREAK TIMER and SLIDE WORKS the ultimate in quick and easy slideshows. TV ELITE now ships with the TV ELITE REMOTE + MOUSE a Windows remote control mouse a \$179 value FREE!

FREE REMOTE + MOUSE \$179 value

(800) 888-5244
 Advanced Digital Systems • (310) 926-1928 • FAX (310) 926-0518

ADS

CIRCLE 798 ON READER SERVICE CARD

ADS Radio ROCK-IT

Advanced Digital Systems
 MULTI-MEDIA • AUDIO • VISUAL

FM Stereo & RDS Data Receiver
Radio on Demand "VCR for Radio"
5 Band EQ & SRS 3-D Sound

For more information or dealer nearest you call:
(800) 888-5244
 Sales 310 926-1928
 FAX 310 926-0518

Learn more about ADS at our WebSite: <http://www.ADS-MM.COM>

CIRCLE 799 ON READER SERVICE CARD

RETURN

"Our ROI is higher with PC Magazine Marketplace advertising."

PUT YOUR AD HERE AND WRITE YOUR OWN PC MAGAZINE SUCCESS STORY. START ADVERTISING NOW! CALL 800-825-4237 TODAY!

Kelly Leopard
 Principal
 Total Recall, Inc.

LINKS LS

NEW LINKS LS: TOUR WITH THE LEGENDS IN SPORTS!

Choose your club and be transported over land and sea to the fairways and greens of the Links LS Tour.

FEATURING:

- UP TO 16.7 MILLION COLORS
- UP TO 1600 X 1200 RESOLUTION
- ARNOLD PALMER AT LATROBE
- THE KAPALUA RESORT COURSES
- ALL NEW MODES OF PLAY
- ALL NEW MULTIPLE VIEWS
- MODEM/NETWORK PLAY

To learn more about the most realistic golf simulation ever, call 1-800-800-4880 or <http://www.accesssoftware.com>

ACCESS SOFTWARE INCORPORATED

CIRCLE 797 ON READER SERVICE CARD

Put your business on the INTERNET

Custom Web Site Solutions

- + Web site design & Hosting
- + Promoting & advertising of web sites
- + E-mail, & domain name registration
- + CGI, JAVA, & VRML programming

High Speed Internet Access

- + Complete ISDN, T1, & T3 solutions
- + Internet consulting & training
- + Lowest Prices & Nationwide

Basic web site package starts from \$299 startup plus

\$299

Call Today
<http://www.cyber-core.com>

CYBERCORE INC. 800-411-4338

CIRCLE 800 ON READER SERVICE CARD

THE ULTIMATE TOOL FOR THE ADVANCED ENTERPRISE



IBM, HP, DEC, TANDDEM, AT&T, TEKTRONIX, WYSE, PRIME, DATA GENERAL, TELEVIDEO, ADDS, HAZELTINE, ANSI...

PERICOM TCP/IP, x.25, NSVT, DECNET, LAT, OSI, IPX SPX...

NOVELL, LAN MANAGER, 3COM, BANYON, PATH-WORKS, PC-TCP, BW-TCP, NETW-TCP, PC-NFS, LANWP, CTERM, OS/2, TELAPI, BAPI, NETBIOS, INT14, INT80, WINSOCK, BICONX25...

KERMIT, X, Y, Z MODEM, FTP, ASCII

FEATURES:
API INTERFACE, BUE SUPPORT, POINT-AND-CLICK KEYBOARD REMAPPING, SOFT-BUTTON PROGRAMMING, INTERNAL SCHEDULING, COLOR PRINTING, and many more

ALL IN A SINGLE PACKAGE

FOR DOS, WINDOWS, NT, 95 AND UNIX



US HQ: 2271 Highway 33, Suite 106

Hamilton Square, New Jersey 08690

Phone 609 588-5300 Fax 609-588 8906

Other locations include: United Kingdom, Germany

For more information call 1-800-233-2206

CIRCLE 801 ON READER SERVICE CARD

MACINTOSH TO WINDOWS PEER TO PEER FILE AND PRINT SHARING \$199.

NEW! Personal MACLAN Version 5.5 is the only cross platform networking software that provides peer-to-peer file and printer sharing between Macintosh and Windows or Windows 95. Macs can share files from any Windows PC through Chooser. PCs can mount local Macintosh drives as a logical drive letter.

"Simply the best AppleTalk for Windows product you can buy"
MACUser - November 1995

- Peer to peer sharing of any hard drive, C D ROM or floppy drive
- Print from Windows to any AppleTalk printer
- Print from the Macintosh to any Windows post script printer
- No special software required for the Mac user
- Backup you PC from your Mac
- New 32 bit Apple talk VxD provides better performance
- Compatible with Windows for Work groups, NetWare and other LANs



Order now

Miramar Systems

800-862-2526

Call for competitive upgrades

email: sales@miramarsys.com.

www.miramarsys.com

CIRCLE 802 ON READER SERVICE CARD

TRY PEOPLESCHEDULER ABSOLUTELY RISK FREE!

NOW GET PEOPLESCHEDULER FOR A SPECIAL PRICE AND GET A 60 DAY MONEY BACK GUARANTEE.

Often, the toughest part of managing any organization is trying to juggle the needs of your customer, the needs of your business and the needs of your employees. But now there is PeopleScheduler. It's the complete solution to scheduling your employees - and managing your business. Try PeopleScheduler for 60 days. If you are not delighted, simply return the software within 60 days for a full refund.



One User License Pack \$179 \$99

Five User License Pack \$399 \$299

Ten User License Pack \$549 \$449
(plus \$9.95 shipping and handling, U.S. only)

PeopleScheduler is also available at:
CompUSA, Computer City, Egghead,
Fry's Electronics, Micro Center & Staples

SPECIAL PRICING, Call 1-800-598-1222
AND ASK FOR OFFER 405.



Adaptiv Software Corporation copyright 1996 all rights reserved. www.adaptiv.com



CIRCLE 803 ON READER SERVICE CARD

ROM BIOS UPGRADES

Do you need new AMI, Award, MR BIOS or Phoenix BIOS?

- Support Windows 95
- 32 bit Blockmode transfer
- Support Plug & Play
- User defined hard drive types
- DX4 75 MHz Support
- P2VT & Pentium Support
- 64 Bit Video Support
- Hard drive support beyond 1K cylinders
- Supports EDD/ATA translation support 1-2-3-4 2-8MB
- High Drives
- Four serial port support
- Three levels of password protection

We are
The Oldest and Largest BIOS Upgrader in the World
— Guaranteed Lowest Prices All the Time —
NOW SHIPPING INTEL TRITON UPGRADES!!!

UNICORE
SOFTWARE INC.

ORDER TODAY!
800-800-BIOS

1538 Turnpike St. • North Andover, MA 01845
(508) 686-6008 • Fax (508) 683-1640

MA, FL, CA Offices

(2467)

AGB AMI AST COMPAQ DELL DTK IBM SPURIN OVRIDE (UPGRADE) HYDRON KEYBOARD LEARNING BIOS
ARCHIMOS BIOSUPGRADE SAMURAI SANYO TANDY TARGO DELL AMERICAN BYTES AND MANY MORE...

CIRCLE 804 ON READER SERVICE CARD

Put your Company on the World Wide Web!

INTERNET
VIRTUAL WEB HOSTING

- Domain name registration provided (http://your_name)
- Unlimited updates via your own FTP account
- 500 MB of data transfer per month (10:1 per MB over 500 MB)
- 10 MB of disk space for your html documents & graphics (1:1 per MB over 10 MB)
- Full T1 to the Internet
- Unlimited e-mail address forwarding
- Custom CGI script support via your own cgi-local directory
- Detailed web usage statistics & access to raw log files
- Controlled anonymous FTP
- TrueSpeech™ server support included (real-time audio)

\$24.95
per month*

Also Available:
Graphics and Page Design
Real Audio™ 2.0
SSL Secure Processing
mSQL Database Tools



http://www.hiway.net 1-800-339-HWAY sales@hiway.net (407) 989-8574

CIRCLE 805 ON READER SERVICE CARD

**If you're paying
America Online® \$2.95/hour*
to connect to the Internet,
perhaps we can interest you
in this nice bridge?**



Thanks to IDT Internet, you no longer have to be a scientist or superspy to log on to the world's greatest resource of interactive information.

What's more, only IDT Internet lets you access it all — yes all — for just \$15/month. (That's \$15 for IDT Unlimited Internet™ or \$29 for IDT Unlimited Internet Plus™ with free Netscape.)

Save up to 99% monthly with IDT!

Internet Usage	IDT Unlimited/Unltd.Plus	AOL	Prodigy®	Compuserve®
1.5 Hours/day	\$15 / \$29	\$127.95	\$74.20	\$73.70
3 Hours/day	\$15 / \$29	\$260.70	\$206.95	\$161.45
All Day	\$15 / \$29	\$2,119.20	\$2,065.45	\$1,389.95

This means **only \$15** — instead of \$54.20 if you spend 20 hours online with AOL. **Only \$15** — instead of \$73.70 if you spend 45 hours online with Compuserve. And **only \$15** — instead of \$2,065.45 if you're online all month long with Prodigy!

**Or a similarly exorbitant sum to Compuserve or Prodigy*

IDT Internet is a trademark of IDT, Inc. All other trademarks mentioned are the property of their respective owners.

Simply put, IDT Internet can save up to 99% on your monthly online charges. And there's no censorship!

As if that's not enough, IDT Internet is nearly always a local call, and tech support is free and unlimited (plus, we don't keep you waiting forever to get help).

By now you're probably very interested in switching to IDT Internet.

If not, perhaps we can interest you in a nice bridge?



IDT Internet

Where time isn't money™

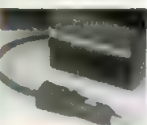
1-800-743-4343

CALL 24 HOURS A DAY

BATTERIES

LAPTOP • CELLULAR • CAMCORDER

• Power your portable on the road
• Put a 120V power outlet in your car



• Connect to a data phone system
• Runs up to 200kips

CAR CORDS

• 1 Year Guarantee • ENERGY+ batteries
• Volume Discounts • Overnight delivery

Call for FREE
Battery Guide & Catalog

800-BATTERIES

(800)228-8374

www.powerexpress.com

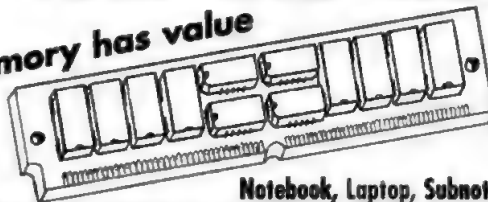
• Tel: (408)879-1930 • Fax: (408)879-1969
• Order 24hrs / 365 days • Hours: 10-12

CHARGERS

CIRCLE 551 ON READER SERVICE CARD

We'll Pay YOU for Your Old Memory

All Memory has value



1x9 4x9 30 Pin
1x32 2x32 4x32
1x36 2x36 4x36
8x36 72 pin

Notebook, Laptop, Subnote, Credit Card (IC DRAM) Modules

Trade-In \$ ANY SIMMS \$ Upgrade

SOJ, TSOP, ZIP, DRAM, VRAM, IBM * Over 30 Years Experience • We now Sell Memory & CPU's



THE MEMORY LIQUIDATORS

800-718-7755

531 Main St., Ste. 1174, El Segundo, CA 90245 • Ph. 310-326-5656 • Fax 310-326-7790

"The company that buys memory back"

CIRCLE 552 ON READER SERVICE CARD

Best Quality
Lowest Prices
All PC's MACS
Notebooks Laptops
Printers

LOWEST PRICE ON ALL PC & MAC MEMORY

LIFETIME GUARANTEE

Memory for all Printers, Notebooks, and Laptops
If you don't see it Call 1-800-662-7466

84K DIPS

256K x 1DIPS

1MB x 1DIPS

256K x 4 DIPS

University, Government
and Corporate P.O.'s with
Approved Credit

DMS

Data Memory Systems Inc.
Salem, NH 03079
Tel: 603-898-7758
Fax: 603-898-6585

EQO MEMORY AVAILABLE



1MB	1x9	1x8	30 PIN
4MB	4x9	4x8	30 PIN
8MB	2x36	2x32	72 PIN
16MB	4x36	4x32	72 PIN
32MB	8x36	8x32	72 PIN

Available in 80, 70, 60 Nano Seconds
Available in Simm, Sip, or DIMM

1-800-662-7466

Memory Upgrade Specialists Since 1987

CIRCLE 553 ON READER SERVICE CARD

168 club

OPEN TO THE PUBLIC
FOR THE FIRST TIME
FOR THE FOLLOWING ITEMS ONLY

SIMM CONVERTER
FOUR 30 Pins
to ONE 72 Pin

\$6⁹⁹

HITACHI QUAD SPEED
CD-ROM DRIVE
MODEL # CDR-7730

\$39⁹⁹

VISA MASTER DISCOVER PREPAID SORRY NO COD
OPEN 24 HOURS CALL FOR INFORMATION

1-888-CALL168

Prices, Specifications, and Availabilities are subject of change without notice. We are not responsible for any misprints. All trademarks are the property of their respective holders.

CIRCLE 555 ON READER SERVICE CARD

Blow-Out Sale!

Modem 28.8
... \$110 ...

MONITORS

14" SVGA 28 DP NO MONITOR	\$175
14" SVGA 28 DP NO MONITOR	\$230
15" SVGA 28 DP NO MONITOR	\$300
16" MONITOR REPAIR	\$75

ACCESSORIES/MOTHERBOARDS/CPU

Keyboard	\$15	Mouse	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15
CD-ROM	\$15	Hard Drive	\$15
Power Supply	\$15	Memory	\$15
Mouse	\$15	Keyboard	\$15
Monitor	\$15	Speaker	\$15
Printer	\$25	Scanner	\$15

MEMORY

Guaranteed Lowest Prices
Life Time Warranty

- 30 Pin SIMMS
- 1 MB—16 MB
- 72 Pin SIMMS
- 1 MB—64 MB
- 168 Pin DIMM
- 4 MB—64 MB
- All Power Books
- All Printers
- VRAM, DIMM, CACHE

WE BUY MEMORY

Eritech International
1-800-808-6242

818-244-6242 818-502-5059

CIRCLE 560 ON READER SERVICE CARD



RECORD CD'S

YAMAHA 4X

CD-R MULTIMEDIA BUNDLE

\$14.99

BOTH BUNDLES INCLUDE MULTIMEDIA CD CREATION SOFTWARE

- ARCHIVE ONTO CDs
- DISTRIBUTE MULTI-PLATFORM CDs
- CREATE TRUE AUDIO & VIDEO CDs
- WRITE GAME FORMATS

PHILIPS or SONY

2X Write / 4X Read

UNIQUE TRAY LOADING SYSTEM

\$8.99

MEDIASTORE

800-555-5551

CIRCLE 559 ON READER SERVICE CARD

SIMM Converter™

Memory Adapter Boards



Convert 30-pin SIMMs into 72-pin SIMMs!
Now four models to suit your needs:

- Convert four 30-pin SIMMs into a 72-pin SIMM
- Convert eight 30-pin SIMMs into a 72-pin SIMM
- Convert four 30-pin SIMMs into one 30-pin SIMM
- 100% Compatibility Guaranteed
- 486, Pentium and Mac Compatible
- Win 95 Compatible
- Completely transparent to your computer
- Fits next to your adjacent 72-pin SIMMs

DigitTech is your low cost solution!
Dealer, Distributor & Corporate inquiries welcome!
Call Now to Order.

1-800-800-RUDY

GET MORE INFO AND ORDER ON-LINE!
<http://www.digi-tec.com/simmcon>
DigitTech, Inc. • (804) 479-1274
1706 Volvo Parkway • Chesapeake, VA 23320

CLASSIFIED

BASON HARD DRIVE WAREHOUSE

800-238-4453

420MB		
Fujitsu 2825S	SCSI	\$198
540MB		
Conner CF3544	SCSI	\$135
Seagate 3680A	IDE	\$145
Seagate 3600N	SCSI	\$135
720MB		
NEC 3425	SCSI	\$155
Quantum 730A	IDE	\$159
850MB		
Quantum 850A	IDE	\$178
Quantum 850S	SCSI	\$175
1.0 GB		
Conner 1088S	SCSI	\$229
Conner 1060S	SCSI	\$239
Fujitsu M1606	SCSI	\$229
HP 3323A	SCSI	\$229
NEC 3745	SCSI	\$199
Seagate 51080A	IDE	\$199
Seagate 51080N	SCSI	\$219
WD 21000A	IDE	\$209
1.2 GB		
Maxtor 71260A	IDE	\$229
Quantum 31280S	SCSI	\$219
Quantum 31280S	SCSI	\$239
Seagate 31270A	IDE	\$209
WD 31200A	IDE	\$219
1.6 GB		
Conner CF3532A	IDE	\$235
NEC 3747	IDE	\$239
Maxtor 71626A	IDE	\$239
Seagate 31644A	IDE	\$229
WD 31600	IDE	\$269

2.0 GB		
Conner 2105S	SCSI	\$539
Conner 2107S	SCSI	\$579
Fujitsu 2915S	SCSI	\$559
HP 3325A	SCSI	\$549
Micropolis 4221AV	SCSI	\$639
Maxtor 72004A	IDE	\$309
NEC 2010A	IDE	\$299
Quantum BF2550AT	IDE	\$339
Quantum 2100S	SCSI	\$539
Quantum XP32150	SCSI	\$599
Quantum 31270S	SCSI	\$469
Seagate 32430N	SCSI	\$559
Seagate 32140A	IDE	\$309
Seagate 32550N	SCSI	\$599
Seagate 32550N	SCSI	\$599
Seagate 32400N	SCSI	\$579
3.0 GB		
Seagate 43400N	SCSI	\$459
4.0 GB		
Conner 4207S	SCSI	\$899
Fujitsu 2934S	SCSI	\$849
Micropolis 3243	SCSI	\$899
Micropolis 3243AV	SCSI	\$999
Quantum 343016P	SCSI	\$849
Quantum 3430N	SCSI	\$899
Seagate 35230N	SCSI	\$899
Seagate 35150N	SCSI	\$1059
9.0 GB		
Micropolis 1991	SCSI	\$1759
Micropolis 1991AV	SCSI	\$1959
Seagate 410800N	SCSI	\$1799

Wide SCSI Drives		
2.0GB Fujitsu 29150AU	\$499	
2.0GB Quantum 32150W	\$599	
2.0GB Quantum 32210W	\$659	
2.0GB Seagate 32430W	\$699	
2.0GB Seagate 32550W	\$699	
4.0GB Conner 4207W	\$899	
4.0GB Fujitsu 2934W	\$899	
4.0GB Micropolis 3243W	\$1059	
4.0GB Quantum 34301W	\$899	
4.0GB Quantum 34300W	\$929	
4.0GB Seagate 35230W	\$999	
4.0GB Seagate 35150W	\$1059	
8.0GB Micropolis 1991W	\$1899	
8.0GB Seagate 410800W	\$2159	
Tape Drives - SCSI		
2.0GB Conner MS2000Ext	\$649	
2.0GB WangDet 3100	\$649	
2.0GB HP 35470	\$649	
2.0GB Exabyte 4200	\$749	
4.0GB Conner 4324	\$799	
4.0GB WangDet 3200	\$799	
4.0GB NP 1535	\$799	
4.0GB NP 3545	\$749	
4.0GB Sony 4000	\$799	
7.0GB Exabyte 8200DL	\$999	
8.0GB Conner 4326	\$879	
8.0GB WangDet 3400	\$879	
8.0GB NP 1633	\$879	
8.0GB Conner CT8000	\$879	
8.0GB Sony 5000	\$879	
14.0GB Exabyte 8505	\$1299	
16.0GB Conner 4584	\$1999	

Memory		
Call for everyday new prices!		
Standard 72 Pin SIMM		
4MB 1x32 / 36	\$ 75 / \$ 85	
8MB 2x32 / 36	\$145 / \$165	
16MB 4x32 / 36	\$289 / \$339	
EDO 72 Pin SIMM		
4MB 1x32 / 36	\$ 85 / \$115	
8MB 2x32 / 36	\$185 / \$215	
16MB 4x32 / 36	\$349 / \$399	
Controllers		
Adaptec		
1542CF	\$166	
2940 PCI	\$195	
2940 PCI Wide	\$239	
2940 PCI U-Wide	\$245	
Sony (w/ kit)		
SA-2400 IDE	\$35	
SA-2400 ISA	\$99	
SA-7048S VESA	\$139	
SA-3600 PCI	\$99	
SA-3000W PCI-Wide	\$139	
2.5" Notebook Drives		
We carry most of the Name Brands		
210MB IDE/SCSI	\$169 / --	
340MB IDE/SCSI	\$229 / \$259	
520MB IDE/SCSI	\$319 / \$329	
810MB IDE/SCSI	\$369 / --	
1.0GB IDE/SCSI	\$479 / --	
1.3GB IDE/SCSI	\$569 / --	

3.0GB SCSI
Seagate 43400N
\$459

2.0GB SCSI
Quantum 32170S
\$469

Always the Low Price Leader!
Super High-Capacity Experts!

CIRCLE 581 ON READER SERVICE CARD

ACTION

You're not the only one reading this ad!
81% of PC Magazine subscribers
look at Marketplace
and almost all of them act.

84% Took Some Action

**71% Bought a Product
Or Service**

**41% Referred the
Information To Others**

Advertise Here,
Where Brand Specifiers
Buy Direct!
Call 800-825-4237 Today!

CD ROM TOWER AND JUKEBOX SERVERS FOR ALL OPERATING SYSTEMS

- Sony-Toshiba-NEC-Plexor quadruple/six Speed Drives
- Discport or Discserv CD Rom networking included
- Unlimited user license
- Map CD Rom drives as if they were disk drives
- NLM's run on server but tower can be located anywhere on network
- Complete kit to network your CD Roms
- Raid Systems Available

JES HARDWARE SOLUTIONS
CD-ROM RECORDERS

FOR BEST PRICE
CALL (800) 482-1866
<http://www.jescdrom.com>

CIRCLE 582 ON READER SERVICE CARD

Make Money BUILDING & UPGRADING PCs

Become a PC technician in a
couple of days, *not weeks*.
Amazing intensive fast paced
course is based on clear easy
to understand videos.

Includes:

- Two VHS Video Tapes
- Anti Static Wrist Strap
- Professional Repair Kit
- Workbook
- Electronic Computer Glossary
- Ongoing Tech Support

Entire Course Only \$159

— ALSO AVAILABLE ON CD —

PC Learning Series
40 New Plant Road
Owings Mills, MD 21117

1-800-659-8070

**Satisfaction & Success
Absolutely Guaranteed!**

CIRCLE 583 ON READER SERVICE CARD

barcode anything

From Zebra, the #1 maker of complete barcoding solutions.

Zebra Technologies makes a full line of fully integrated barcode products including:

Labeling Software • Tracking Software
Hand Scanners • CCD Scanners • Label Printers

Call today for product information and the dealer nearest you. 1-800-477-5569, ext. 5500



CIRCLE 564 ON READER SERVICE CARD

BarCode DISCOUNT WAREHOUSE, INC.

Will Beat Any

Advertised Prices for Comparable Merchandise

Metrologic 951/17 Laser Scanner • With built-in wedge \$308	RadioWand Bar Code Reader • Wireless wand • 30' - 150' range • Free bar code software \$495
---	---

EZBarcode BarLabeler 3" CCD Scanner (with decoder) Bar SP2120/200 Receipt Printer MHP EC200 Cash Drawer Logic Controls CR21000 Cash Drawer \$149 \$199 \$299 \$199

1-800-888-2239 VISA
 Phone: (216) 826-0283
 Fax: (216) 826-0633 • email: bcdw@rcd.com
 8862 Engle Rd. #212 • Middleburg Hts., OH 44130

CIRCLE 569 ON READER SERVICE CARD

POINT OF SALE

- PC To POS Conversions
- Bar Code Scanners
- Bar Code Printers
- Receipt Printers
- Mag-Stripe Readers
- POS/Inventory Software
- Portable Data Collectors
- UNIX POS Hardware
- Time & Attendance
- IBM 468X/9X

Most Brand Names

NuRol direct

800-390-6623

Fax 404-239-9607

<http://www.nurol.com>

BAR CODING

CIRCLE 565 ON READER SERVICE CARD

PSC **Videx**
Metrologic **Brand Name**
symbol **Intermec**
PERCON

BARCODE CATALOG

FREE

COMPSEE **Webb**
DATAMAX **CHERRY**
WAND FIELD PRODUCTS **1011**
Zebra **HEWLETT PACKARD**

88 PAGES WITH 1000'S OF BRAND NAME PRODUCTS

* NEW EQUIPMENT AT DISCOUNT PRICES * SAME DAY SHIPPING
 * 30 DAY NO-HASSLE MONEY BACK GUARANTEE * TOLL FREE TECHNICAL SUPPORT

COMPLETE KITS • FONTS • ID GUIDE
SCANNERS • RF • PORTABLE READERS
DEK • FULL PAGE SCANNERS • SOFTWARE

SYSTEM

WAREHOUSE

SPECIAL APPLICATION PRODUCTS
CASH REGISTERS • RIBBONS • FONTS
TABLES • PRINTERS • AND MUCH MORE

\$49 **FONTS**
BARCODE FONTS
 ANY ONE FOR \$49, ALL \$99
 Code 39 • Extended Code 39 • UPC-A
 UPC-E • EAN/JAN • Interleaved 2 of 5
 Code 128 • Codabar • Code 93
 MSI Plessey • PostNet Fonts

\$99 **STARTER KIT**
 Create...Scan...Learn
 Complete Starter Kit:
 includes:
 • WAND
 • DECODER
 • BARCODE FONTS
 • BARCODE BOOK

\$299 **WAND & S/W KIT**
 WAND KIT with Tracking and
 Label Software for Windows
 Complete Kit includes:
 • The \$99 Starter Kit
 • Tracking Software
 • Labeling Software
 • BARCODE BOOK

CALL 800-397-8703 • 214-516-1100 **800-397-8703**
 1401 Capital Ave. Plano, TX 75074 Internet Address: <http://www.systemid.com>

CIRCLE 566 ON READER SERVICE CARD

Just Scan it!

\$199

Wedge & Wand
Special

Offer Expires 6-31-96

Also Available From ITS:



• Scanners • MSRs • Terminals

FREE Wand with the purchase of a
Keyboard Wedge

OR
CCD with Wedge
for \$298

CALL
For A Free
Bar Code
Guide

Quick Setup & Easy-To-Use
Guaranteed No-Risk Policy

Free Technical Support
Same Day Shipping

Western Time Zones
800-228-9487



Eastern Time Zones
800-826-1688

CIRCLE 567 ON READER SERVICE CARD

THE BAR CODE LEADER DOES IT AGAIN

KEYBOARD WEDGE SOLUTIONS!

HAND-HELD LASER
WEDGE COMBO
starting at...

\$595

HEWLETT PACKARD
KEYBOARD WEDGE / WAND

\$239

800 TECHNICAL SUPPORT
30 DAY MONEY BACK GUARANTEE
SAME DAY SHIPPING
2 YR LASER SCANNER WARRANTY

Now 3 Locations To Serve You
1-800-451-5138
EAST COAST

1-800-281-5737
WEST COAST

1-800-260-0531
SOUTHEAST



CIRCLE 568 ON READER SERVICE CARD

PORTABLE
PRODUCTSYOUR COMPLETE SOURCE FOR
BAR CODE AND HANDHELD
DATA COLLECTION SYSTEMS

- **BARCODE READERS** - Keyboard wedge, RS-232, PC, Mac, Most data terminal interfaces
- **INPUT DEVICES** - Laser, CCD, Wand, Slot, Magstripe - All available with built-in decoder
- **PORTABLE HANDHELD READERS** - DOS & Windows Application Generators - No programming experience needed. Develop your Application in minutes
- **Printers, Verifiers, Label Software, Labels, Plug-N-Play RF Systems, Wireless PDA's**

FREE UNLIMITED 800 TECH SUPPORT
UNCONDITIONAL SATISFACTION GUARANTEE
CALL FOR FREE CATALOG

1-800-849-0958

<http://www.portableproducts.com>

PORTABLE
PRODUCTS

8401 K Mayland Drive • Richmond, VA 23294
Phone: 804-346-0111 • Fax: 804-346-0196

CIRCLE 570 ON READER SERVICE CARD

Bar Code Headquarters

Labeling Software
For Dot Matrix or Laser Jet

1 or Windows
and DOS!



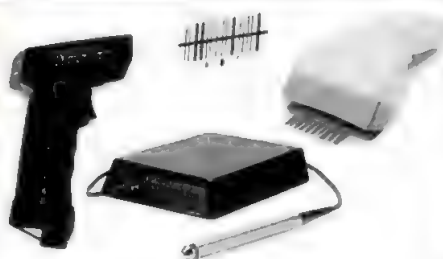
- Any Format, Any Label. WYSIWYG, Text Design
- Formats for Sears, K-Mart, Penney's, WalMart, TCIF, Logmars, EIA, AIAG, etc., included
- Prints Bar Codes: UCC/EAN-128, Code 128, UPC/EAN, 2 of 5, MSI, Codabar, Code 39, Full ASCII Code 39
- Prints Big Text and PCX. Powerful, Versatile, Easy!
- Database for Label Management Included
- Imports ASCII data files from dBase, etc.
- Simplified Operator Interface with Custom Prompts
- LabelRIGHT™ for Windows™ - \$295
- Above Label Printed by LabelRIGHT™ DOS - \$279

Bar Code Fonts for Windows™

- Insert bar codes into any font based Windows program by Clipboard or Hot Key. DLL also furnished
- Prints UPC/EAN, UCC-128, 128, 2 of 5, Codabar, Code 39
- Bitmaps, metafiles and TrueType fonts
- For dot-matrix and laser printers - \$199

Bar Code Readers

for PC, XT, AT, PS/2, Mac
and RS-232 Terminals



- Attaches as Second Keyboard
- Reads UPC/EAN, Code 128, 2 of 5, MSI, Code 39
- Wand, Magstripe, CCD, Slot Badge or Laser Scanner
- European and South American Keyboards Supported
- Superior Read Rates. Made in USA.
- **Top Rated by Independent Reviews**
- Complete Stainless Steel Wand only Reader - \$329
- Complete Integrated CCD Scanner - \$499
- Complete Integrated Laser Scanner - \$655

Portable Bar Code Readers
for PC, XT, AT, PS/2, Macintosh,
and Serial Interface Computers

WITH
VOICE!

- Battery Operated Reader - 64K or 256K
- Kybd or Serial Intf.
- Display messages & voice messages prompt operator.
- Pick lists, tables.
- Wand, CCD or Laser Scanner
- UPC/EAN, 128, 2 of 5, MSI, Code 39, etc.
- Date/time stamps
- Built-in Inventory Programs - No Programming Necessary
- **Very Easy to Create Custom Prompts**
- Small Size-Only 12.5 oz. - 65,000 scans/battery set
- 64K Unit Complete with Wand & Voice - \$799
- 256K Unit Complete with Wand and Voice - \$899



Radio Frequency Terminal

New



- 150 to 600 foot Range
- Longer range with Relays
- 16 Selectable Frequencies
- No License Required
- 2 way RS-232 Communication
- Wand, Laser or CCD
- Host triggered Voice Messages to advise and guide Operator
- 6.3" x 3.3" x 1.25", 12 oz.
- 1-16 Terminals/Base Station
- Complete Base Station - \$795
- Complete Terminal with Steel Wand Scanner - \$1255
- Complete Terminal with Laser Scanner - \$1654

Cordless RF Wand Reader

New Rugged Design

- For IBM or Macintosh Computers
- Base Station to Wand - 150'
- \$200 units extends range by 100 feet for each unit added
- USA and Canada Approved
- Serial or Keyboard Interface
- No License Needed
- Complete Cordless Wand - \$595



These ads work!
71% of those
who read
Marketplace ads
buy off the page.

Advertise Here,
Where Brand Specifiers
Buy Direct! Call
800-825-4237 Today!

Ordering is Easy!

800-345-4220

Europe Phone: (053) 1 6614 566 • Europe Fax: (053) 1 6614 622 USA Phone: 408-456-9938 • USA Fax: 408-456-9964

- Made in the USA
- "800" Tech Support
- 30 Day Money Back Guarantee
- Qualified P.O.'s Accepted
- 2 Year Warranty on Readers
- Same Day Shipping
- Free UPS Blue in US
- Direct from the Manufacturer

WORTHINGTON
DATA SOLUTIONS

Call for
our Free
Catalog

CLASSIFIED

BAR CODE READERS

AMERICAN MICROSYSTEMS

2190 Regal Pkwy. • Euless, Texas 76040 • (817) 571-9015

FOR PC, XT, AT, PS/2 & TERMINALS:



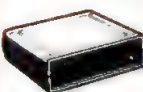
MAG STRIPE



SLOT (BADGE)



WAND



DECODER BOX



- ▶ No software changes required
- ▶ Data appears as keyboard input
- ▶ Reads Code 39, I-2of5, UPC/EAN, Codabar 11, 93, 128, MSI/Plessey
- ▶ Auto-discriminates between codes
- ▶ Accepts WAND, SLOT, MAG STRIPE, CCD, LASER
- ▶ Easy To Use



LASER



CCD



METRO LASER

BAR CODE PRINTING SOFTWARE:

- ▶ For Epson, OKI, IBM, Dot Matrix and HP LaserJet Printers
- ▶ Prints Code 39, I-2of5, UPC/EAN, Codabar, 128, 93, 11, MSI/Plessey

PORTABLE READERS:

- ▶ Use as a portable, wedge or terminal
- ▶ Input Devices: WAND, CCD, or SV LASER
- ▶ Real-time clock for date and time stamps
- ▶ Automatic power off with resume
- ▶ "Built-in" inventory programs
- ▶ 54 key alpha/numeric keyboard
- ▶ Supports HAYES compatible modems



(800) 648-4452 • FAX: (817) 571-9015
30 Day Money Back Guarantee
One Year Warranty

Networking & Emulation Cards

- 04H8095 PCI LAN Streamer.....\$325.
- 92G7632 Auto Token Ring Board.....\$199.
- 04H6922 Auto PCMCIA Token Ring Board.....\$280.
- 53F6425 3278/79 Emulation Adapter.....\$325.
- 30F5383 5250 (S36/AS400) Emulation.....\$189.

Montana Network & Emulation Products are Manufactured for Liberty Research by IBM.

Your #1 Networking Products Source.



Montana Options 406-771-7736

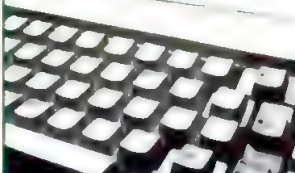
A Division of Liberty Research Group Inc.

CIRCLE 571 ON READER SERVICE CARD

America's most popular, most complete, and most affordable solution for the mail order business—order entry/review, credit card processing with draft capture, UPS manifesting, profit analysis, accounting, telemarketing, list management. Clipper compiled, dBase III+ files. Single and Multi-user versions. Find out why more people buy MOM after comparing! Demo kit \$25 refundable deposit.

MailOrderManager™

Dydacomp Development Corporation
150 River Road, Suite N1, Dept. PCM
Montville, NJ 07045
1-800-858-DMOM
201-355-1256



CIRCLE 572 ON READER SERVICE CARD

Voice Mail Cash Machine



Earn thousands of dollars monthly by adding a VoiceVenture to your 486. Answer a home/office phone, rent pagers, process mailorders, accept credit cards, passwords, or operate a pay per call service using a 900, 976, or 540 number.

Profit today! Order our \$50 VoiceVenture Guide loaded with startup ideas and will be applied on future system purchases.

Start A Home Business Today

Kis'n'Tel
Matchmaking/ live chatline

Speak'n'Sell
Classifieds, fax, voicemail, paging

From '1996. (Ask about 0% interest leasing)

ElderChok
Senior citizen/ kid monitor

TollBridge
Sell long distance and debit cards

VoiceWorld™
8502 E. Via de Ventura, 228
Scottsdale, AZ 85258 USA

Questions?
800.283.4759
602.922.5500
Fax 602.922.5872

CIRCLE 574 ON READER SERVICE CARD

BEST BAR CODE PRINTER VALUE

LABELWRITER SE200 PLUS

\$499
List Price



- 203 dpi direct thermal. 2" per second.
- 21 built-in bar code symbologies.
- 20 available type sizes.
- Modified Epson FX command set.
- Windows print driver also included.
- RS232 serial interface. Parallel option.
- Rugged design. 100,000+ installed.
- Battery pack available.
- Other models available starting under \$250.

1-800-426-7827, ext. 145

Internet: <http://www.costar.com>
Fax: 1-203-661-1540. CoStar Corp.



FAXfree

On The Internet

- Start to reduce or **eliminate FAX costs** today!
- FAX Images and Graphics within your documents
- Download **free** shareware at:
<http://www.tacsys.com>

CIRCLE 573 ON READER SERVICE CARD

BUYERS

Marketplace readers are buyers. 60% of them bought hardware from a Marketplace ad in the last 12 months.

Advertise Here, Where Brand Specifiers Buy Direct!
Call 800-825-4237 Today!



If your business depends on your inventory and equipment --

MaintainIt.™

Just \$189.

Affordable, feature-packed maintenance management software for small business.

MaintainIt™ For Windows™ makes it easier than ever to track and maintain all your crucial equipment: • production machines • vehicles • office equipment • tools • safety devices • HVAC equipment • audio/visual equipment • refrigeration equipment • hundreds of other items.

Datastream™
The Leader in Maintenance Software™

call 1-800-328-2636.

http://www.dstm.com
PCM-MAG

CIRCLE 575 ON READER SERVICE CARD

Don't Choose Static Be Pragmatic!

Unlike ASIC dongles from our competitors, only the Marx CRYPTO-BOX™ Dongle has an **advanced dynamic algorithm** built into its programmable microprocessor.

Marx's dynamic algorithm can continually change — making it virtually impossible for pirates to decode its protection and copy your protected software.

Not only does the Marx dynamic algorithm provide **higher security** read/write memory, but it also **encrypts and decrypts data faster** — so your software runs faster!

Check out the superior Marx CRYPTO-BOX Dongle and find out why it's the best-selling microprocessor-based dongle in all of Europe.

MARX Intelligent Innovations
INTERNATIONAL, INC. For Software Protection Since 1985
1-800-627-9468
Fax 404-321-0760
Visit our Web Site: http://www.marx.com

CIRCLE 577 ON READER SERVICE CARD

Free Offer

Manage PCs

Download a complete, free trial copy of WinBatch 96.

<http://www.windowware.com>

This macro language manages all your PC systems, Windows applications, and network solutions. Includes software for every Windows version.

WinBatch is \$99.95 (with a compiler it's \$495). No-hassle, 90 day, money back guarantee.

Wilson WindowWare
info@windowware.com

1.800.938.4590

Office: 1.206.938.1740

Fax: 1.206.935.7129

CIS: GO WILSON, Sec. 15

CIRCLE 576 ON READER SERVICE CARD

B.S. & M.S. In Computer Science

Get the opportunity and earning power a college degree confers—without leaving home and without spending thousands of dollars.

- ALL COURSES HOME STUDY
- Approved for tuition reimbursement by leading corporations
- Increase your earning power
- Join students from leading computer companies
- Using Windows, C++ and Ada courses available
- CareerPath training in computer programming available

**AMERICAN
INSTITUTE
COMPUTER
SCIENCES**

For free information
call 1-800-767-AICS

ACCREDITED MEMBER
World Federation of
Universities and Colleges

SURFCAM 3DSTUDIO TANGO AUTOCAD

FEAR NO HARDWARE LOCK

Especially Rainbow Sentinel™ Locks

Introducing RIVALOCK!!!!

A software replacement for
hardware lock devices!

904-797-6600
904-797-LOCK fax

IMAGINE THAT 2730-Q US 1 South
St. Augustine, FL 32086

CIRCLE 578 ON READER SERVICE CARD

**'We've solved your
inter-connecting puzzle.'**

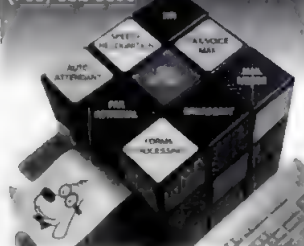
Avoid the twists and turns by
choosing the ultimate in
Enhanced Fax/Voice Solutions

TRY THIS DEMO:

Info. via fax: 708/924-3030

Doc. No. 889833

Faxfacts
by
Sopis International Ltd.
Wheaton, Illinois
(800) 689-8898
(708) 682-8898



Home Study ACCREDITED B.S. DEGREE in Computer Science

Easy-to-study lessons in Multimedia, C, C++, Visual Basic, Assembly Language, Unix, Database Design, Cobol, Ada, Pascal, & many more lead to the only home-study BSCS degree accredited by an agency recognized by the U.S. Department of Education.

Professional software & hardware provided at no extra charge. Programs in Computer & Electronics Engineering Technology as well, all accredited by the Distance Education and Training Council and VA Approved. Our 46th year.

Free Catalog: 1 (800) 955-2527

**GRANTHAM
College of Engineering**

Grantham College Rd., Slidell, LA 70469-5700



CRYPTKEY SOFTWARE LICENSING SYSTEM

"Software protection with no hardware or disk key"

CrypKey is software copy protection that is:

- completely secure from diskcopy programs
- customer friendly - no disk or hardware key, less support calls, instant disaster recovery
- compatible with CD-ROM, BBS, Internet!

CrypKey can increase your software sales by allowing you to sell your program:

- by increments—sell add-on software options
- by runs—e.g. sell 100 calculations for \$100.00
- by time—e.g. lease your program for 60 days.

CrypKey is completely compatible with MS-DOS, MS Windows, Win 32s, Windows 95, Windows NT, and Windows NT Alpha.

CrypKey uses a numeric key that can be transmitted by phone, fax, or e-mail. Sell your customers more options, more copies, more time or more runs instantly, just by making a telephone call (great for overseas customers).

CrypKey is produced by Kenonic Controls Ltd., engineering and software since 1972.

Kenonic Controls Ltd.
7175 - 12th Street S.E.
Calgary, Alberta, Canada T2H 2S6
Ph.(403)258-6200 fax:(403) 258-6201
Internet: crypkey@kenonic.com

CIRCLE 579 ON READER SERVICE CARD

Would You Turn Your Back on \$20,000?

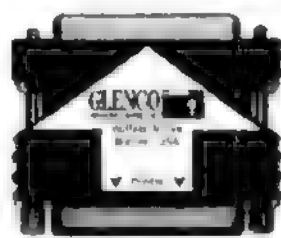
\$21,875 is the average additional sales revenue for a \$1000 software application in the U.S. that's protected with Hardlock*. Just because you're a software developer doesn't mean that your business has to put up with minimal profits due to piracy. Over 10,000 developers and programmers have already discovered the key to increasing their revenues by a huge percentage:

Dependable, effective copy protection. Hardlock.

Any way you choose, choose Glenco:
the #1 Seller of Secure Copy Protection products!



Hardlock LT



Hardlock

All backed by a full 3-year warranty

"I can tell you that after evaluating 3 vendors, your product and SUPPORT was by and away the best!"

Glenn Stucker
Director of Systems Development
Scientific Consulting Inc.

"When it comes to security, Hardlock is undoubtedly the highest quality copy protection system."

Byte Spain Oct. '95

Call now for a \$14.95 Evaluation Kit --
Start seeing your *real* profits!

1-800-562-2543

GLENCO
ENGINEERING INC.

SERVING THE SOFTWARE INDUSTRY SINCE 1979

Software Protection • Data Security

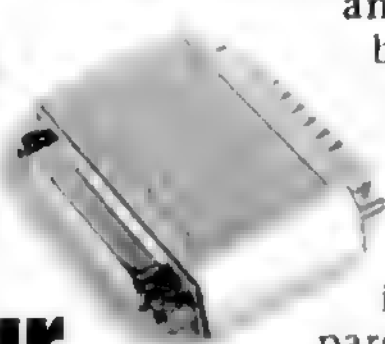


Visit us on the Web at <http://www.glenco.com>

*Based on the SPA's estimated U.S. piracy rate for 1994. Dollar amounts are calculated per 100 applications sold, with the average cost of 125 Hardlock keys already deducted from the total. Call 847-808-0300 or Fax 847-808-0313 for a distributor in your country. ©1996 Glenco Engineering, Inc.

CIRCLE 580 ON READER SERVICE CARD

**The world's
most effective
way to stop
piracy and
increase your
software sales**



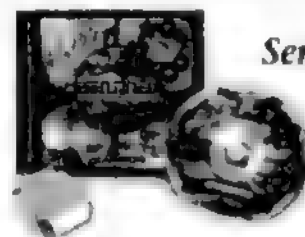
Over eight million Sentinel® keys protect software and ensure revenue worldwide.

Only Sentinel combines leading technology, ISO certified quality and the industry's best reliability in one affordable key.

What's more, Sentinel protection is easy to implement and transparent to your software customers.

Call now for a **FREE Sentinel Software Protection Guide.**

Order your Sentinel Developer's Kit today!



Featuring the
Sentinel CD-ROM,
it's the easiest
way to ensure
your sales

SENTINEL
Software Protection

Call (800) 852-8569

RAINBOW
TECHNOLOGIES

Visit us at: <http://www.rnbo.com>
Tel: (714) 450-7300 • Fax: (714) 450-7450
Offices & distributors located worldwide
©1996 Rainbow Technologies, Inc. Sentinel is a registered trademark of Rainbow Technologies

CIRCLE 581 ON READER SERVICE CARD

SAY "NO" TO PIRATES!

If you worry about piracy when distributing your product, let us help! For ten years, Az-Tech has been providing software protection to thousands of developers worldwide. Our products **EVERLOCK**, **Safe-D** & **EVERKEY** offer the level of security needed at affordable prices.

Internet/CD-ROM Activation
CPU-Lock * CD-ROM Lock * Serialization
Registration * Date & Execution Limits
Windows 95 * 3.11 * DOS

*Protecting your product
will increase your profits!*

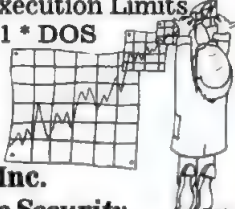


Az-Tech Software, Inc.
Leaders In Software Security

Phone: (816) 776-2700 * Fax: (816) 776-8398

Internet: <http://www.tyrell.net/~aztech>

E-mail: aztech@tyrell.net



Data Recovery

Novell, DOS,
Windows 95, MAC

ECO Electronics, Inc.



**The
data recycling
center**

ECONOMICALLY and ECOLOGICALLY the
place to send your hard drive, removable
media, and/or floppy diskettes!

**No Evaluation Fees
24 Hour Service Available**

Competitive Pricing

Over Operating Systems - Call

800-339-3412 • 407-691-0019

407-691-0014 Fax

4115 Burns Rd., Palm Beach Gardens, FL 33410

CIRCLE 587 ON READER SERVICE CARD

DATA CONVERSION

DISKS • TAPES • CARTRIDGES
CONVERSION-DUPLICATION-SCANNING

MORE FORMATS THAN ANYONE!

Quick • Reliable • Quality

WORD PROCESSORS, MINIS
MICROS, SPREADSHEETS
DATABASES, MAIL LISTS

IBM, DEC, APPLE, WANG
HP, WordPerfect, MS-Word



Lotus
Dbase
MICROM
LANIER
CPT, NBI

3480/3490, DC2120

8/4MM, XEROX, CP/M, UNIX

NATIONAL DATA CONVERSION

5 East 16th Street, New York, NY 10003

(212) 463-7511

AMERICA'S LEADERS IN DATA CONVERSION

CIRCLE 584 ON READER SERVICE CARD

KEY-LOK™

Security

- ☐ Successful software piracy prevention since 1982.
- ☐ Algorithmic response
- ☐ Programmable memory
- ☐ \$14/1,000, \$16/10, \$20/2
- ☐ No setup fees
- ☐ Remote update
- ☐ Multiple security levels
- ☐ Counters & Lease Control
- ☐ Multiproduct licensing
- ☐ DOS/WINDOWS/NT/UNIX

Also, Access Control Systems
& Disk Drive/System Locks

Microcomputer Applications

3167 E. Otero Circle
Littleton, CO 80122

(800) 4KEYLOK

(303) 770-1917 FAX: -1863

CIRCLE 585 ON READER SERVICE CARD



DATA RECOVERY

Lost your data? Don't panic CALL!

800-886-2231

No Data...No Charge

- ✓ 24-hour
- ✓ weekend
- ✓ priority
- ✓ on-site

- Virtually every operating system
- Competitive prices
- Clean-room facilities

DATA MECHANIX 18271 McDermott Street, Suite B, Irvine CA 92714

PHONE: 714-263-0994 FAX: 714-263-1549

CIRCLE 586 ON READER SERVICE CARD

DATA RECOVERY IN HOURS

- Over 10 years of experience with clients worldwide including HP, NASA, & FedEx.
- We've recovered more than half-a-million megabytes of lost data.
- You only pay if there's a recovery.
- Call 24-hours a day.



LAZARUS

DATA RECOVERY

Working at the speed of business

800-341-DATA

415 435 5556 • FAX 415 405 5553 • RESTRICTIONS MAY APPLY

381 Clementina Street • San Francisco, California 94133

CIRCLE 588 ON READER SERVICE CARD

Computer Insurance



Sure It's Insured?

Our Computerowners^(SM) Policy insures your computers against theft, fire, accidental damage, natural disasters even power surge! Annual premiums start at \$49 for up to \$2,000 of equipment. Call now for information or coverage!

1-800-SAFEWARE

1-800-800-1492
Available in the US and Ontario.

SAFEWARE,

The Insurance Agency Inc.
5760 N. High St., PO Box 656
Columbus, OH 43085-3978

CIRCLE 583 ON READER SERVICE CARD

WHEN YOU ABSOLUTELY, POSITIVELY HAVE TO GET YOUR DATA BACK...

We specialize in high quality data recovery, with expertise in most operating systems.

- Hard Drive
- CD-R
- Disk Array
- All Removable Media
- Tapes (DAT, QIC)

FREE DIAGNOSTIC EVALUATION

**800
469-2549**



MICROCOM™
OVER 15 YEARS OF EXCELLENCE

19011 Ventura Blvd. Tarzana, CA 818 881-7417 • 818 881-8015 Fax

CIRCLE 586 ON READER SERVICE CARD

DATA CONVERSION

If you want the most complete conversion services in the industry, just call...

(800) CONVERT

Capabilities include over 6000 formats

**PIVAR
COMPUTING SERVICES, inc.®**

165 Arlington Heights Rd. #M
Buffalo Grove, IL 60089

(847) 459-6010

CLASSIFIED

Ontrack

DATA RECOVERY

The World Leader in Data Recovery Services

- Ontrack Data Recovery Inc. is the world's largest data recovery company, with over 100 offices worldwide.
- Ontrack is the only company that can recover data from all types of storage devices, including hard drives, floppy disks, CD-ROMs, and tape drives.
- Ontrack is the only company that can recover data from damaged and formatted drives.
- Ontrack is the only company that can recover data from drives that have been physically damaged.

NY: 1-800-672-2559
 CA: 1-800-752-7557
 D.C.: 1-800-850-2410
 Europe: +44 1372 741999
 Japan: +81 429 32-8388

Ontrack Data Recovery Inc. is a registered trademark of Ontrack Data Recovery Inc. All other names are trademarks of their respective owners. Internet: <http://www.ontrack.com>

CIRCLE 590 ON READER SERVICE CARD

Affordable DISKETTE & CD-ROM Duplicating Equipment

MAKE YOUR OWN COPIES!

- Simple to Use.
- Super Reliable.
- A Snap to Set Up.
- Easily Pays for Itself.
- Free Media With Your Equipment Purchase

BULK DISKS/CD-R'S
Verbatim • Dyson • TDK

DISKS: 3.5 LD or HD	Qty:	250+	1000+
Blank		.35	.32
Formatted		.42	.38
CD-R's: 63 or 74 Min	25+	100+	
Taiyo Yuden	8.29	7.29	
TDK	8.99	7.99	

WE CAN ALSO DUPLICATE CD'S AND DISKETTES FOR YOU
24 hour turnaround. Custom labels & packaging. Highest quality media. Total Quality Assurance.

800-426-0247
Fax (908) 892-6186

PRINCETON DISKETTE

1101 Richmond Ave., Pt. Pleasant Beach, NJ 08742

CIRCLE 593 ON READER SERVICE CARD

SO, YOUR HARD DRIVE SPLIT AND TOOK ALL THE DATA WITH IT?

PROFESSIONAL DATA RECOVERY SERVICES.

HARD DRIVES, FLOPPY DRIVES, SYQUEST, EZ-135, ZIP, JAZ, OPTICAL AND BERNOULLI. ONE-DAY SERVICE AVAILABLE. COMPETITIVE RATES.

Dear John, I know what you need

TOTAL RECALL
THE DATA RECOVERY COMPANY

800-743-0594

2462 WAYNOKA ROAD COLO SPRINGS, CO 80915 • 719-380-1616 • 719-380-2022 • <http://usa.net/totrecall>

CIRCLE 591 ON READER SERVICE CARD

Software Turnkey Manufacturing Services

Highest Quality Media & Equipment

- Graphic & Package Design
- Diskette Duplication
- CD-ROM Mastering & Replication
- Printing: Color Boxes, Product Packages, Custom Labels, Manuals & Data Sheets
- Product Assembly, Packaging & Shrink Wrapping
- Inventory Warehousing & Order Fulfillment

Duplication 100% Guaranteed!
Fastest Turnaround & Best Pricing

Apc, Inc.
29620 Union City Blvd.
Union City, CA 94587
Tel (510) 489-8877
Fax (510) 489-8878

TO ORDER CALL: 800-666-1007

CIRCLE 594 ON READER SERVICE CARD

RAPID REPRODUCTION

SIMPLE-FAST-SMART-RELIABLE
MANUAL DISKETTE DUPLICATORS
AX \$1,695 AS SHOWN

AX 1000-2000 SERIES

- FORMATS, COPIES, VERIFIES
- 360-5.25"/HR. - 180-3.5"/HR
- COPIES ALL MFM FORMATS
- RELIABLE TEAC DRIVES
- AVG. 100,000 COPIES/DRIVE
- STAND ALONE OPERATION
- 1 YEAR WARRANTY
- AUTOLOADERS AT \$2,195

AXIOMATIC TECHNOLOGIES CORPORATION
4995 Timberlea Blvd, Mississauga
Ontario, Canada, L4W 2S2
(905) 602 9270 Fax: (905) 602 9279

CIRCLE 596 ON READER SERVICE CARD

DATA RECOVERY

when **I.T.** matters...

- all tape, optical, and CD media
- accidental overwrites
- all systems
- physical damage
- hardware and software failure

Don't Panic - call VOGON!

Tel: 405 321 2585
Fax: 405 364 8242

VOGON EST. 10 YEARS+

DATA CONVERSION & DUPLICATION

UK Tel: +44 (0)1734 890042
UK Fax: +44 (0)1734 890040

CIRCLE 592 ON READER SERVICE CARD

DISKETTE DUPLICATORS

Choose an OEM that has serviced industrial and commercial customers since 1983

SYSTEMS FROM \$1995

FACTORY LIFETIME WARRANTIES

PATENTED GRAVITY FEED DESIGN
U.S. PATENT NO. 5,031,660

FOR ORDERS OR FOR MORE INFORMATION:
800.927.4297

ASHBY INDUSTRIES
FAX 405-722-1771
E-MAIL: ASHBYIND@AOL.COM

CIRCLE 595 ON READER SERVICE CARD

DUPLICATION EQUIPMENT

Up to 350 disks per hour.

StandAlones starting at:

\$1995

For more information or to order:
CALL 1-888-723-DISK (3475)
(510) 373-6060

Champion
Software Duplication Systems

CIRCLE 597 ON READER SERVICE CARD

DISKETTE DUPLICATION

HIGHEST QUALITY MEDIA

- 3.5" and 5.25" Formats
- Custom Labels/Shutter Printing
- Diskette Mailers/Accessories
- Assembly Services
- Bulk and Formatted Diskettes
- Generous Volume Discounts

CD ROM Duplication

- Pre-Mastering Services
- One-off/Small Volume Runs
- Large Volume Replication
- Packaging Accessories
- Blank CDR Media 63 & 74 Min.

800-255-3142

Diversified Systems Group, Inc.
P.O. Box 1114
Issaquah WA 98027

CIRCLE 602 ON READER SERVICE CARD

Total Project Management for Software Manufacturing and Information Distribution

- Diskette & CD-ROM duplication services
- Online information distribution services
- Authoring & electronic publishing services
- Bulk media sales (brand & generic)
- On-demand printing (manuals, mailings, etc.)
- Packaging, assembly & distribution
- Duplication equipment sales & servicing

100% guarantee! Superior quality, fast turns & best pricing



Serving the corporate and software communities since 1983

819 Highway 33 East, Freehold, NJ 07728

Tel: 800 MEGASOFT Fax: 908 462-5658

Internet Worldwide Web: <http://www.megasoft.com>

CIRCLE 598 ON READER SERVICE CARD

DUPLICATION SERVICES

- NO Minimum Quantity
- Highest Quality Media & Equipment
- Duplication 100% Guaranteed
- Manuals & Documentation
- Packaging & Assembly Services
- Warehouse & Fulfillment Facilities



Media Factory, Inc.

1480 Junction Ave. San Jose, CA 95131
http://www.mediafactory.com
Computerize: 754671560dampserve@com
Fax: 408 456-9298

800-886-6833

CIRCLE 603 ON READER SERVICE CARD

Your One Stop Shop!

CD Duplication
3.5" & 5.25" Diskettes
Package Design
MultiMedia Design
Software Manuals
Product Warehousing
Product Fulfillment
& Distribution



DupliSoft, Inc.

800-554-3873

<http://www.dupliSoft.com>

VISA, Master Card & AMEX accepted

CIRCLE 600 ON READER SERVICE CARD



FOREVER! IS A LONG TIME

MITSUI CD-Recordable Media Stands the Test of Time.

- Highest Proven Durability Against Heat, Humidity & U.V. Light
- LIFETIME Warranty - Longest in the Industry!
- Best Choice for Pre-Mastering, Archiving and Music Recording
- 63 Min (580Mb) & 74 Min (680 Mb) in Stock for Immediate Delivery
- Complete Selection of CD-ROM Recorders and Mastering Software

Silk Screening Available With Your Company Logo!

800-454-0100



AMC DISTRIBUTING

The Multimedia Solutions Source
P.O. Box 3456 • Redmond, WA 98073
206-889-0587 • FAX 206-861-8391

Purchase Orders Accepted from Rated Firms and Government Agencies.

CIRCLE 599 ON READER SERVICE CARD

Automatic Disk Duplicator

Win95
DMF
SupportStandalone \$1,995
from

Industrial quality duplicators
at half the price. Copies up
to 165 3.5" PC & Mac
diskettes per hr.

1-800-887-9906

or (510) 689-1695

Lease, Rent, Trade-in

CopyPro the low price leader

CIRCLE 607 ON READER SERVICE CARD

Diskette

★★★★
★ Free
Labels

Premium	Qty 999	Qty 1,000
3.5" DS/HD Formatted	23¢	22¢
3.5" DS/DD Formatted	22¢	21¢
Color Disk Yellow Purple Green White Print on		
3.5" DS/HD Formatted	25¢	24¢

• Diskette Boxes • CD Racks/Cases
• Mouse Pads • Computer Speakers
Lowest \$8 on all computer Accessories
Call for Free Catalog

1-800-843-8431 Fax 415-343-9932
ProMedia Computer Supplies, Ltd.
6821 Via Coma St. Ste. 1 So. San Francisco, CA 94065

CIRCLE 605 ON READER SERVICE CARD



Disk Duplication

Duplicate Disks or CD-ROM
DDI specializes in duplication
services for industry

- Diskette Duplication
- Assembly Services
- Mailers/Accessories
- CD-ROM Duplication
- Turn-Key Solutions

Call today and let DDI's professionals
manage your duplication requirements

800-430-3487

919-881-8219 Fax 919-881-9954

CIRCLE 601 ON READER SERVICE CARD

DISKETTE & CD-R
DUPLICATION
EQUIPMENT

For in-house
duplication,
MediaFORM
is the source



Duplication Systems

75 Disks/Hr.	\$2295
120 Disk/Hr.	\$2695
140 Disks/Hr.	\$3195
300+ Disks/Hr.	\$4995

Bulk CDRs Available

MediaFORM™

800-220-1215

610-458-9200 • Fax 610-458-9554
LEASE & RENTAL PLANS AVAILABLE

160-480 DISKS PER HOUR...
AUTOMATICALLY



The new Perfect Image™ Series
100 Diskette Duplicators offer
Systems that Feature:

- Price & Performance to meet your needs
- 1440 rpm IQ Drive
- Format, copy & verify
- Networking for higher volume
- Modular design for easy expansion

800.445.8288



R IMAGE™
612.944.8144

CIRCLE 806 ON READER SERVICE CARD

SEATTLE
QUALITY
3.5" DISKETTES
DD/HD 1 & 2mb 28¢-39¢ ea.!

- Duplicator Quality
- ED 4mb \$1.77-\$2.00ea.
- IBM, MAC, Unformatted
- Brand Label or Unlabeled
- Bulk or Branded 10&50Pks (50pc.min)
- Tested and Certified 100% Error Free
- M/C, Visa & PO on approved credit

Made
in USA!

800-482-DISK
(24 hours)

Manufactured for major brand disk companies since 1988.
SEATTLE DISK, PO Box 1580, Mukilteo, WA 98275
(206) 340-4708/(360) 347-9000 Fax: 355-0195
e-mail: seadisk@aol.com

CIRCLE 610 ON READER SERVICE CARD

HP, IBM, Canon, Epson, Apple, NEC

TONER

Cartridge Remanufacturing
For Laser Printers



MICR Toner, Fonts, Software
For Check Printing

ADVANTAGE
LASER PRODUCTS, INC.

1-800-722-2804

2030 Powers Ferry Road, Suite 230
Atlanta, GA 30339

On the web at <http://www.advlaser.com>

CIRCLE 613 ON READER SERVICE CARD

The Ultimate
Desk



The Look of Leather
CAN-AM
The Strength of Steel
800-387-9790
<http://www.io.org/~canam>

CIRCLE 808 ON READER SERVICE CARD

VIZIFLEX SEELS

YOUR NO. 1 SOURCE
FOR COMPUTER SKINS
AND DUST COVERS



- Viziflex Seels eliminates the problem of dirt, spills and other contaminants on your computer keyboard
- Over 3,000 configurations available.
- Need a customized cover? Viziflex can make'em.

Contact us for a FREE catalog packed with many unique computer accessories.

1-800-30SEELS

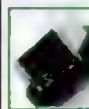
VIZIFLEX SEELS, INC

166 Lafayette Ave., Hackensack, NJ 07601
(201) 487-8080 (201) 487-6637 Fax

CIRCLE 609 ON READER SERVICE CARD

JetMaster

Re-Usable Ink
Jet Refill System



Lowest cost per recharge in the world. Buy kit, later just buy additional ink, which is available in 2 oz., pint, and gallon size. Costs as low as \$1 per recharge. Waterproof inks available. Most Inkjet printers supported.

BJS (Stylewriter Canon Bubblejet)	\$29.95
JM6 (HP 500 Series)	39.95
JM6-MC1 (HP 500 Series Black/Color)	\$69.95
JM6-MC1-600 (HP 600 Series Black/Color)	\$69.95
BJS-MC1-600 (Canon BJC-600)	\$49.95
BJS-MC1-2400 (Canon 4000-4100)	\$49.95
Black Jet Ink (2 oz.)	\$10.50
Color Jet Ink (2 oz.)	\$11.50

Order toll free 1-800-647-6500

Computer Friends, Inc.

<http://www.teleport.com/~cfriends/>

E-Mail: cfriends@teleport.com

Tel. (503) 626-2291 Fax (503) 643-5379

CIRCLE 612 ON READER SERVICE CARD

PC Magazine
Marketplace
Shoppers have
wide ranging
product needs.
Last year, on
average, they
bought 15
different
products from
Marketplace
ads.

Advertise Here,
Where Brand
Specifiers Buy
Direct! Call
800-825-4237
Today!

Source: 1994 PC Magazine Marketplace Subscriber Study

NEW
**CAR
DESK™**

At Last! Now You Can
Read, Write, Use Your
Laptop With Ease.



Makes Your Car an Office™

- NO TWISTING
- Slips On and Off Steering Wheel-Use When Parked
- Low Introductory Price

Call 24 Hrs/7 Days

Only \$29.95 + \$4.75 S&H

VISA 1-800-945-9911 MC

100% Money Back Guarantee
HOFFMAN MANUFACTURING

CIRCLE 611 ON READER SERVICE CARD

BBS HOT LIST

Online's Best!



24 Hours Live Women Online Uncensored Chat
File Libraries • 8 N 1 Up to 28.8

Credit Cards Online 954-725-0705



24 Hour Free International BBS
Uncensored Chat • Huge File Libraries • 8 N 1

Int'l. Rates Apply 011-852-1729-0912



24 Hour Free Uncensored BBS
Hot Live Chat • Huge File Libraries • 8 N 1

Int'l. Rates Apply 011-852-1729-0914



<http://www.adultsex.com>

Adults Only 18+

Oriental Express World Wide BBS

011-852-1729-8946

**Adult files + live
on-line hostesses**
instant access—call from
anywhere—get in!

no censorship/no restrictions
Must be over 18 • Int'l. rates apply

FANTASY GIRLS

Adult live video on you PC!

Free Video Conference software
your own private live model
modem to modem—18+ only
Download file from free area
<http://www.blushing.com>

Restricted adult site \$1+
access FV/Ecash

CIRCLE 624 ON READER SERVICE CARD

LEGEND Graphics Online

Adults Only

Super VGA
Photo Images

Adult GIFs
Movie Pics

Download Computer
Images and Animated Movies!

IT's The LATEST

IT's The HOTTEST

CHECK IT OUT

DOS Win95 & Mac Files
E-Mail Around the World

Modem: (909) 689-9229

(No per min./hry fees) Must be Adult to Access

CIRCLE 625 ON READER SERVICE CARD

Hot! Hot! Hot! Hot! A-D-U-L-T FROM YOUR MODEM

THE EXCHANGE
Exclusive Adult System

ADULT PHOTOS (GIFS)
ANIMATED ADULT MOVIES
HOT INTERNET ADULT CHAT
INTERNET ADULT NEWS GROUPS

**NO HOURLY CHARGES!
DOWNLOAD LIMITS!**

Modem: 516.579.5550

**EASY ACCESS
VIA THE INTERNET!**

Internet: BBS.Specdata.Com
199.173.293.4

Supporting up to 28.8 Kbs, H-8-1 Full Duplex
21 or older to access adult files

CIRCLE 623 ON READER SERVICE CARD

ADULTS ONLY CD ROM SOFTWARE

IBM INTERACTIVE

Diva X Ariana \$38
Diva X Rebecca \$38
Dream Machine 2 \$49
Girlfriend Tracy \$39
Intimate Peabodys \$39
Japan Interactive \$44
Lolita \$44
Mystik Mistress \$36
Nightwatch IA 3 \$49
Penetration \$19
Penthouse IA 6 \$52
Porno Poker \$44
Romsoft 6 Pack 2 \$39
Sorcery Sex Kittens \$42
Space Sirens 2 \$29
Vampire's Kiss \$36
Virtual Valerie 2 \$36
Wanderlust \$44

CALL TO 800-273-7910
ORDER SOURCE 10690

FAX 802-767-3302 INT'L 802-767-3033
PO BOX 14 DEPT. 10690
HANCOCK, VT 05743

Must be an Adult to Order. Restrictions Apply. Call for Details.

CIRCLE 650 ON READER SERVICE CARD

Smoke Your Modem FREE! FREE! FREE!

217-322-1999

Super Sexy Chat

Super Sexy Chat

Super Sexy Chat

ALWAYS FREE!!!

Chat, IRC
FTP, Telnet
News & GIFS

All Welcome To Chat

Gay-Straight-Bi
Swingers

(Must be 21+)

CIRCLE 626 ON READER SERVICE CARD

SEXY EXPLICIT ADULT EROTIC IMAGES!

WARNING! WARNING!

HIGHLY EXPLICIT SEXUAL ENTERTAINMENT!

OVER 100,000 ADULT GIF, SHAREWARE,

WINDOWS/DOS FILES-UPDATED DAILY!

FREE UNLIMITED DOWNLOADS!

NO SUBSCRIPTION REQUIRED!

USE YOUR MODEM TO DIAL

011-373-
837-1234

(INTERNATIONAL LONG DISTANCE RATES APPLY. 18+)

CIRCLE 627 ON READER SERVICE CARD

FREE
Sexy Images

THE LACE NETWORK
(818) 709-4275

An On-Line Service For Adults

Exceptional Quality
All Original Material
Centerfold Models • Adult Film Stars
Adult Entertainment Fan Clubs • E-mail The Stars
Amateurs • Swimwear • Lingerie
Computer Movies • Multimedia

Set Your Modem to 8-H-1 and Your Terminal Emulation to ANSI
• Adults Only • Local Access Available in over 1000 cities
throughout the U.S. and Canada • Visit Our Website:
www.lace.com or Telnet to lace.com • Voice (818) 710-9077

CIRCLE 629 ON READER SERVICE CARD

75M BBS

Fantasia Services
Unlimited

you've tried bigger...
now try better!

FREE TRIAL ACCOUNTS

• PAGE ADULT LIBRARY
• 40 CD-ROMS Online
• Over 30 GIGS of files
• FULL INTERNET Access
• SEXY LIVE Online Chat
• Cyber DATING NETWORK
• USENET Newsgroups
• 250,000 Shareware, GIFS,
DOS, Windows & MAC files
• 28.8 Access Available

(714)-279-1140
TELNET: 206.162.7.2
fsubbs.com

18 or Older (18+): Voice Support Line (714) 961-0335
DISCREETLY BILLED

CIRCLE 631 ON READER SERVICE CARD

For ages 18 & older HOT ONLINE CHAT

LIFESTYLE
ONLINE

#1 SWINGER'S CONTACT SYSTEM
COUPLES & SINGLES

SWINGING/B&D/BUFETISHES
Meet hot contacts online • Sizzling
personal profiles • Erotic classified
ads • Less than .30c per hour

MODEM: 516-689-5390
INTERNET: Telnet lifestyle.com
(166.82.150.22)

Pictures hot enough to melt your modem
Super Hot Adult
Computer Images
at Super Low Cost

GRATIA

Modem: 516-689-2853
Internet: Telnet gratia.com 166.82.150.31

CIRCLE 628 ON READER SERVICE CARD

SURFING For SEX?

RIDE
THE EXOTIC WAVE OF
ADULT
ENTERTAINMENT

FREE ACCESS

Adult Novelties
Videos & CD-Roms

NY Video

www.nyvideo.com

ADULTS ONLY

CIRCLE 628 ON READER SERVICE CARD

LIVE-LIVE-LIVE

CLUBLOVE
ADULT PLAYGROUND

The internet's premiere adult playground
with live encounters, private one-on-one
fantasy shows, adult shopping, the world's
most complete erotic adult yellow pages,
pictures, movies & more.

**CHECK IT
OUT!**

MUST BE 18+

<http://www.adultplayground.com/pc>

ADULTS ONLY

CIRCLE 630 ON READER SERVICE CARD

UNCENSORED ASIAN BEAUTIES HOT & FREE!

Over 10 GB of high
quality adult GIFS.

Loads of original content.

UNCENSORED
world-wide live chat.

!! All Free !!

Call now:

011-852-172-94-944

Erotica East

THE UNCENSORED BBS

Over 18's only.
No credit cards required.
Standard long distance charges apply.

CIRCLE 632 ON READER SERVICE CARD



THE MALE FORUM

MEET HOT GAY MEN
Explore your fantasies!

- Live on-line hot chat for men
 - Erotic classified ads
 - Adult message areas
 - Explicit personal profiles

100% private
Less than 30¢ per hour
You must be age 18 or older

Local access from 600+ cities

MODEM:
516-689-0286 • 212-293-7878

INTERNET:
Telnet: mforum.com (166.82.150.41)



Club Orient

Explore The Uncensored
World Of International
Online!

FREE! Immediate Access

- Thousands of High Quality GIF's & JPEG's to Download.
- Hot Personal Chat, Private or Group...Totally Uncensored!

No Waiting. No Charges & No Credit Cards Needed... Just Dial in with your Modem for a Wild Time!

011-852-1729-0913

Adults Only 18+ - International Rates Apply

Sexy Software™

SEXY CD-ROMS
FREE: VHS Video Tape (2 hr)
WITH EACH CD-ROM: \$49 each or 3 for \$129

Sexy INTERACTIVES
Sexy CD 1 - ORAL FIXATION - interactive Database with 1000+ VGA pictures
Sexy CD 2 - RAM FROM OUTER SPACE - (audio narrated) GPS from space
Sexy CD 3 - PRIMA LUNA - 2 CD set - adult games & movies

Sexy FLIX
TOO NAUGHTY TO SAY NO. RING DING. SEXYCAPADES. SEX GAMES. ASIAN LADIES 1 & 2. SAMURAI PERVERT. 3 BABES 2. 3 & 4 VIRTUAL VIKERS 1 & 2. NIGHTWATCH 1 & 2. SEYMOUR D'YETS 1 & 2. DREAM MACHINE. NEURODANCER. HOT PIX 3. 4. 5. VIRTUAL VALERIE 2

Sexy PIX™
Sexy CD #1 the premiere adult 1 collection - 150 MB of action with over 2500 VGA pictures, stories, cartoons, games, sexual files. DARE TO COMPARE!
Sexy CD #2 an exclusive collection containing over 1000 Super VGA pictures (1280 x 768) 1250 and over 300 MB of true 24 bit color. The sexiest and the quality set money.
Sexy CD #3 another collection of over 650 MB of the hottest pictures available. Over 3000 VGA pictures, movies and utilities.

MENU DRIVEN VIEWING NO DUPLICATION
\$19 CD-ROM BLOWOUT / CALL FOR TITLES

Sexy DISKS
Selfies - premiere adult board game 80 VGA scenes + sound \$79
Original Sexy Disks & disk set games, movies, pictures NEW \$32
Enlightened Lisa & Sexy artificial intelligence virtual woman \$69
Compassion collection movies - movie on disk with sound \$29/ea. 5/54
Interactive Girls Club - interactive games with full motion video \$49

800-462-SEXY (7399) Ext 600 V/FAX 215-997-2571
3.5" or Foreign Orders Add \$2 per disk
CK/MO to: S Software P.O. Box 220
Dept. 600/V/R Hatfield, PA 19440 / ADD \$4 S/H
\$1.50 SHAREWARE SPECTACULAR - FREE CATALOG - 600+ PROGRAMS

CIRCLE 637 ON READER SERVICE CARD

EROTICACOM ADULT BBS

ALL YOUR DARKEST DESIRES NOW DELIVERED VIA MODEM!

HIGH-SPEED BBS ACCESS TO SEXUAL EXCESS!

NO MEMBERSHIP FEES! CALL FROM HOME OR WORK!

OPEN 24 HOURS A DAY! NO CENSORSHIP!

011-852-1729-8994

MUST BE 21+ TO ACCESS DIAL ALL DIGITS INTERNATIONAL RATES APPLY

NEW TECHNOLOGY LETS YOU SEE GIRLS STRIP LIVE ON YOUR PC! GET NAKED ON THE NET TODAY!
<http://www.strippersonline.com>

CIRCLE 640 ON READER SERVICE CARD

Experience the hottest Gay BBS

GAYZONE

011-852-172-97890

- High quality GIF's with large gay file library
- Gay live chat and E-mail
- No extra charge for downloading
- The unparalleled Gay experience.

FREE!
Call now and download
Excellibur Set-up Software for FREE!!

011-852-172-97890

Over 18's only. No credit cards required. International calling rates apply.

CIRCLE 633 ON READER SERVICE CARD

The World's Best & Largest Online Service for

GAY MEN!

Hundreds of Local Access Numbers!
For Your Local Number & Logon Instructions Call:

Voice: (800) 949-2668
Modem: (415) 703-8200

(telnet: bbs.eyecan.com)
(www: http://www.eyecan.com)



Gay Owned & Operated! Adults Only

CIRCLE 635 ON READER SERVICE CARD

CYBERLUST

Over 10,000 Adult GIF's
24 Hour Chat Room
Red-Hot Adult Games
No Membership Fees
No Credit Cards
No 3rd Party Billing
PAY FOR COST OF CALL ONLY!
JUST CALL AND DOWNLOAD
FORBIDDEN ASIAN FANTASIES
011-852-172-98-995
UNINHIBITED CYBER-BABES!
011-592-279-145
MUST BE 21+ TO ACCESS DIAL ALL DIGITS INT'L RATES APPLY
CHECK OUT OUR WEB WEBSITE!
WWW.CYBERLUST.COM

CIRCLE 638 ON READER SERVICE CARD

CyBEROTIComm

Naughty and Nice On-Line Boutique
For a provocative collection of intimate gifts and toys
Erotic! A new kind of night school

Join the most stimulating adult BBS for men and women in cyberspace

Adults only Proof required.
FREE trial for BBS
FREE access to Boutique
212 803 5405 914 323 7105
201 557 6135 516 247 9105
cyberotic.com

CIRCLE 642 ON READER SERVICE CARD

Welcome to AMSTERDAM'S

HOT & HEAVY

The World's BIGGEST Int'l Adult Web Site

- Over 15,000 Adult GIF's & JPEG's at your FINGERTIPS
- More than 200 Video clips for your downloading pleasure
- Hook yourself up to our INTERNATIONAL SWING FORUMS
- Private mailboxes that steam
- Direct order from extensive on-line CD/Video warehouses
- Others can't compete with our prices as low as \$0.06/min

www.hh.nl **Now**
*up to Feb 28 1998 Must be above 21 yr

CIRCLE 634 ON READER SERVICE CARD

The GaRBaGe DuMP

INTERNET ACCESS

NO EXTRA CHARGE
<http://www.dump.com>

TELNET TO dump.com



MUST BE 18 OR OVER

FREE 30 DAY TRIAL
PROOF OF AGE REQUIRED

VIA MODEM
505-294-6260

CIRCLE 636 ON READER SERVICE CARD

CYBER IMAGES

Live Adult Video Phone Sex
Download our software from
<http://www.clark.net/cyber>

Using your PC and modem
You will receive a live, full motion image of a beautiful woman in the privacy of your own home. Interact with her in a one on one text chat or speak to her live while viewing her on your PC. \$9.95 startup fee.

One step away from the real thing.

Call for BBS Access
must be 21+ 1-800-95-CYBER

CIRCLE 639 ON READER SERVICE CARD

ODYSSEY

Where Adults Come To Play!

Hundreds of Local Access Numbers

415-703-8899
800-947-0936

<http://odyssey.ody.com>

CIRCLE 642 ON READER SERVICE CARD

HARDWARE/BATTERIES

Batteries For Everything Portable!

Do your "2-hr" batteries only last 15 min? Try our 4000+ long-life batteries, ac adaptors car cords & charges for... • Laptop • Cellular • Camcorder
Largest selection in country! 1 Yr Wnty. Low prices
Call 800-BATTERIES for FREE battery guide/catalog

POWER EXPRESS

14388 Union Ave, San Jose, CA 95124
Order 24hrs! 800-228-8374 • F408-879-1969

CIRCLE 684 ON READER SERVICE CARD

LAPTOP BATTERIES AND MORE

Batteries for Laptops, Notebooks, Powerbooks, Cellular Phones, Camcorders, Custom Rebuilds, Pulse Power Chargers for Cellular Camcorders that Eliminate Memory Effect. Call for Specs. Call Today Best Prices 1YR. Warty Corp PO/V/MC

VRA BATTERIES

16541 Redmond Way #251 Redmond WA 98052
800-747-8876 24HRFax 206-881-8874

CIRCLE 685 ON READER SERVICE CARD

COMPUTER BATTERIES & MORE

Batteries for laptop/NB/PB, CMOS, camcorders, cameras, RC vehicles, toys, cordless phones/drills/shavers, cellular, remotes, pet fences. UPS/LANS, Ni-Cads, chargers, etc. WE REBUILD! CALL & ASK! WHOLESALE! V/MC/AmX/Dscr/POs.

BATTERY EXPRESS

713 Gladstone St., Parkersburg, WV 26101-5661
800-666-2296/304-428-2296 fax: 304-428-2297

CIRCLE 686 ON READER SERVICE CARD

BATTERIES FOR HUMANS

We sell batteries that run longer, recharge more, and perform better. Guaranteed. For cellular, camcorders, photo, laptops, desktops, and more. Also, accessories. Because the human race won't slow down. We are the

#1 BATTERY SPECIALISTS

109 W. 38th St. Floor 11 New York, NY 10018
Call 800-275-2879 Or Fax (212)768-9530

CIRCLE 687 ON READER SERVICE CARD

SOFTWARE/DATA BASE

Fast ODBC for FoxPro, Clipper, dBASE

CodeSQL is the only ODBC available for Visual FoxPro and Clipper. It's twice as fast as the 32 bit Microsoft drivers. Includes single-user through client/server, Extended SQL Grammar, transaction processing and logging. ROYALTY FREE!

Sequiter Software Inc.

Tel: 403-437-2410 Fax: 403-436-2999
Email: info@sequiter.com Web: www.sequiter.com

CIRCLE 690 ON READER SERVICE CARD

DATA ENTRY

The Data Entry Emulator™

Full featured, heads-down data entry with two-pass verification, edit language, output record reformat, operator statistics, batch control, on-line help, free tech support, key from images (NEW!). For PC, PC LAN, S/36, or AS/400.

Computer Keys

21929 Makah Road, Woodway, WA 98020
800-356-0203/206-776-6443/Fax: 206-776-7210

FOREIGN LANGUAGES/FONTS

Foreign Language Software Leader

Largest selection of "Translation, Dictionary, Language Learning, Fonts, Word-Processing, OCR, Etc." from any company! Best prices. Satisfaction Guaranteed! Free 52 pg. Catalog. <http://www.lanet.com/CLR>

Character Language Resources

800-900-8803 Fax 310-996-2303
2130 Sawtelle Blvd. Ste 304A L.A. Ca 90025

CIRCLE 692 ON READER SERVICE CARD

MEDICAL/DENTAL

LYTEC PRACTICE MANAGEMENT

Advanced practice management for medical, dental, and chiropractic offices. Versions available for DOS Windows, and a new 32-bit version for Windows 95. Web: <http://www.lytec.com>

Lytec Systems

7050 Union Park Ctr, Ste 390 Midvale, UT 84047
1-800-735-1991

CIRCLE 693 ON READER SERVICE CARD

PROGRAMMING TOOLS

Delphi Tools...Free Trial-Run

Orpheus. VCL data entry - validated fields, virtual listbox, Win'95 style tabs, 16MB text editor & more. Async Professional for Delphi, async components. Free Trial-Run download tptrial.txt from CIS: Delphi lib 22, or <http://www.tpower.com>

TurboPower Software Co.

PO Box 49009 Colorado Springs, CO 80949-9009
(800) 333-4160, FAX (719) 260-7151

Hand Your Business Card...

To 1,044,227 of the most qualified buyers in the PC market. These brand-specifiers are looking to buy while reading the industry's #1 publication. There is no more cost-effective or efficient way for you to build sales.

BusinessCard

Call your BusinessCard representative today.
1-800-825-4237

RELIGION

CHURCH MANAGEMENT SOFTWARE

PowerChurch Plus for Windows is making church management easy for over 40 denominations. Membership records, contributions, full fund accounting, network support and much more. Call today for FREE INFO in the mail.

F1 SOFTWARE

208 Ridgefield Drive, Asheville NC 28806
(800) 486-1800. FAX (704) 665-1999.

CIRCLE 696 ON READER SERVICE CARD

ATTENTION BAHAI'S

Refer to Internet...
<http://wantree.com.au/techbase/bahal/guardian.html>
...for documentation proving incontestably that Shoghi Effendi appointed a successor.

CIRCLE 697 ON READER SERVICE CARD

STATISTICAL/RESEARCH

The Survey System - New Version 5.0

Analyzes: marketing, public opinion, customer satisfaction, employee attitude surveys. Handles mail, personal, phone, scanner, disk-by-mail or computer interviews. Records verbatim text & voice answers. Powerful, flexible, user friendly. Free support.

Creative Research Systems

140 Vista View #100, Petaluma, CA 94952-4728
Ph.(707)765-1001/Fax (707)765-1068

CIRCLE 698 ON READER SERVICE CARD

INPUT/DATA ACQUISITION/BARCODE/POS

BAR CODE PRINTERS- ONLY \$1,495!

FREE Windows™ Bar Code Printer Driver with every printer purchase! Print bar codes from MS Word™, Write, Word Pad, Access®, Visual Basic™, Lotus® Approach®, Paradox®, dBASE®, etc. Impeccable print quality, rugged performance!

THARO SYSTEMS, INC.

<http://www.tharo.com/tharo/>
330-273-4408 F:330-225-0099 tharo@tharo.com

CIRCLE 688 ON READER SERVICE CARD

PERIPHERALS

240volts/50Hz PRODUCTS

•EPSON•HEWLETT PACK. •CANON•OKIDATA•APC
•Dealers inquiries Welcome•Lotus, Microsoft & more available in Spanish, French, Portuguese
•Awarded EXPORTER OF THE YEAR IN 1994
•FREE Catlg- 30,000 items- sales@intihitech.com

International High Tech Marketing

12285 SW 129th Court, Miami, Florida 33186
Tel: 305-254-8731 Fx:305-254-8736 Call Today!

CIRCLE 689 ON READER SERVICE CARD

TIMEKEEPING

Control Labor Costs & Activities

TimeCentre is a powerful Windows & MS Access based program for managing timekeeping, scheduling & job tracking. Full feature reporting & payroll support at low cost. Integrates w/remote electronic time recorders. Web: <http://konetix.com/time/>

TIMECENTRE

Konetix, Inc. 3210 Valmont Boulder CO 80301
800-326-2276/303-444-8771/fax 303-442-6286

CIRCLE 694 ON READER SERVICE CARD

SERVICES/COMPUTER INSURANCE

Insures Your Computer

The COMPUTEROWNERS™ insurance policy repairs or replaces hardware, media and purchased software. Rates as low as \$49 a year covers theft, fire, accidents, power surge and more! Call for immediate coverage or info. 1-800-800-1492.

Safeware, The Insurance Agency Inc.

2929 N. High St., PO Box 02211
Columbus, OH 43202 1-800-SAFEWARE

CIRCLE 695 ON READER SERVICE CARD



Advertising Sales Staff

One Park Avenue
New York, NY 10016
212 503-5100

DISPLAY ADVERTISING

Dan Rosensweig - VP, Publisher
(212) 503-5354
**Nancy Newman - National Associate
Publisher**
(212) 503-4453
Vickie Pinsky - National Sales Director
(212) 503-5651
Ad Coordination Supervisor
Julie Eigo
(212) 503-5107
Advertising Coordinator
Amy Cimetta
(212) 503-5037

**Frank Quigley - East Coast
Advertising Director**
(212) 503-4564

**Kimberly White - New England
Area Manager**
(617) 393-3055

MA, NH, VT, ME, RI, Canada

District Sales Manager
Tim Castelli (617) 393-3058
10 President's Landing, Mystic Center
Medford, MA 02155
Account Representative
Joyce Rossell
(617) 393-3054

CT, NY, NJ, PA

Senior District Sales Manager
Anne Fitzpatrick (212) 503-3703
One Park Avenue, 4th Floor
New York, NY 10016
Account Representative
Lynn Bader
(212) 503-5112

DE, MD, DC, VA, WV, NC, SC, AL, MS,
TN, AR, KY, GA, FL

District Sales Manager
Andrew Zeiger (404) 814-8950
3405 Piedmont Road NE, Suite 460
Atlanta, GA 30305
Account Representative
Chris Yates
(212) 503-5032

NE, WI, IL, IN, KS, MN, MO, MI, IA, ND,
SD, OH

District Sales Manager
Tim Colby (312) 214-7353
150 North Wacker Drive, 25th Floor
Chicago, IL 60606
Account Representative
Kevin Hein
(212) 503-5011

TX, OK, LA, NM

District Sales Manager
Quin Rodriguez (214) 360-5725
5956 Sherry Lane, Suite 625
Dallas, TX 75225
Account Representative
Carolyn Stahel
(214) 360-5770

**Mike Kisseberth - West Coast
Advertising Director**
(415) 578-7809

**Mark Malloy - Southwest
Area Manager**
(310) 268-1331

CA (Los Angeles), AZ, HI

District Sales Manager
R.J. Kirkland (310) 268-1381
11766 Wilshire Blvd., Suite 1550
Los Angeles, CA 90025
Account Representative
Ed Beach
(212) 503-5113

CA (San Diego & Orange County), NV

Senior District Sales Manager
Robin Kofsky (714) 852-5920
18301 Von Karmen Avenue, Suite 330
Irvine, CA 92715
Senior Account Representative
Elizabeth O'Connor
(212) 503-5040

**Mike Klein - Northern California
Area Manager**
(415) 578-7810

CA (San Jose), CO, ID, AK

District Sales Manager
Jennifer Hillis (415) 578-7816
950 Tower Lane, 20th Floor
Foster City, CA 94404
Account Representative
Jordan Klineman
(212) 503-5024

CA (San Francisco & North),
OR, WA, BC

District Sales Manager
Marjorie Scholtz (415) 578-7807
950 Tower Lane, 20th Floor
Foster City, CA 94404
Account Representative
(212) 503-5047

CA (South San Francisco to
Mountainview), UT, WY, MT

District Sales Manager
Jon Schwartz (415) 578-7813
950 Tower Lane, 20th Floor
Foster City, CA 94404
Account Representative
Marti Meyerson
(212) 503-5161

CENTRAL ADVERTISING

VP, Central Advertising
Robert A. Bader
Director of Sales and Marketing
Paul Fusco
Sales Manager
Leanne Morrill
Production Director
Vicki Egan
Sr. Production Coordinator
Rob Scott
Sr. Production Coordinator
Eileen Convery
Advertising Coordinator
Audie Marie Tinoso

ID, MT, NV, OR, UT, WA, WY, AK,
Canada

Account Representative
Nicole Riesman
(212) 503-5156

AL, AR, FL, GA, LA, MS, NC, SC, TN, WV,
KY, DE, DC, IL, IN, MD, MI, VA, WI

Account Representative
Alyson O'Regan
(212) 503-5138

CA (213, 310, 619, 714, 805, 818, 909), HI

Account Manager
John Burke
(212) 503-5076

CT, ME, NH, RI, VT, MA, NJ, PA, NY, OH,
Foreign

Account Manager
Bill Masterson
(212) 503-5150

CA (209, 408, 415, 510, 707, 916)

Account Representative
David Priest
(212) 503-5118

MO, AZ, CO, IA, KS, MN, NE, NM, ND,
OK, SD, TX

Account Manager
Erik Weigel
(212) 503-5188

**Business Card
Advertising**
Call: 1-800-825-4237
PC Magazine Marketplace
One Park Avenue, 3rd Floor
New York, NY 10016

**For more information
regarding *display*
advertising please call:**
212 503-5100
1-800-33MAG AD

**For more information
regarding *central*
advertising please call:**
212 503-5115
1-800-825-4237

*From the world leader
in value-packed software!*



Learning

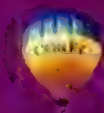
SERIES

Easy interactive learning on CD-ROM

Corel's Learning Series offers comprehensive training courses on CD-ROM that guide you step by step through some of the most exciting software programs on the market. Each title offers the equivalent of two days of classroom instruction, enabling you to learn a program's key features and functions quickly and easily. Best of all, the VCR-style pause, skip or repeat controls let *you* set the pace! Corel's Learning Series—bringing you easy interactive desktop training.

For Windows® 3.1

Runs on Windows® 95



From the
makers of
CorelDRAW®

Look for other award-winning titles in the
Corel® CD HOME series—more than
30 exciting entertainment, education and
reference titles on CD-ROM!



*An easy way to
learn on CD-ROM!*



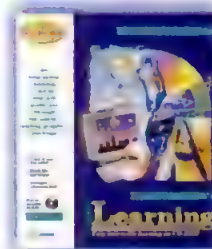
An easy way to learn
Windows® 95



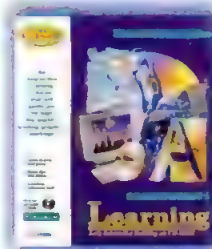
An easy way to learn
CorelDRAW® 6



An easy way to learn
CorelDRAW® 5



An easy way to learn
CorelDRAW® 4



An easy way to learn
CorelDRAW® 3

\$19.98



1-800-258-2088
Please refer to Source Code C724

CIRCLE 044 ON READER SERVICE CARD



Enter the Corel \$3,000,000 World Design Contest!
(September '95 to July '96)
To receive a faxed copy of the contest rules and
an entry form, please call: 1-613-728-0826,
ext. 3080, Document # 1125.
To leave a message: 1-613-728-0826, ext. 81809.
To send a fax: 1-613-728-2891.

Corel and CorelDRAW are either trademarks or registered trademarks of Corel Corporation in Canada,
the United States and/or other countries. Windows is a registered trademark of Microsoft Corporation.

After Hours

EDITOR'S RATINGS: ★ Poor ★★ Fair ★★★ Good ★★★★ Excellent

CD DOS

Windows

Windows 95

CD-ROM

Resource-Intensive

Adult Content

Kids (Ages)

Price

Terra Nova: A Little Bit of Everything

Terra Nova: Strike Force Centauri

Looking Glass Technologies; 617-441-6333; <http://www.lglass.com>. Circle 467 on reader service card.

★★★★★

You may have proven your close-quarters fighting skill in DOOM. You might even have shown your tactical prowess in X-COM or Jagged Alliance. But in Terra Nova: Strike Force Centauri, you have to do both—at the same time.

Terra Nova is a DOS-based game from the developers of Flight Unlimited, System Shock, and Ultima Underworld. The game requires a Pentium, but it runs well even on low-end Pentium systems.

You play Nikola ap Io, a hotshot foot soldier representing the Centauri colonies in the 23rd century. The decadent Earth Hegemony is always

causing trouble, and tensions are high. As the game begins, you're brought on-board a new strike force to help combat increased pirate activity in your sector. But as you make your way through Terra Nova, you'll soon discover that pirates are the least of your worries.

Over the course of 37 ground-pounding missions, you will lead a squad of soldiers against enemy forces. As squad leader, you start by assembling your team, taking care to in-



clude any specialists you might need, such as a reconnaissance or electronics expert. Most missions will require a team of four,



but some are solo jobs. You get the outline of each mission during an excellent briefing session, complete with animation, maps, and spoken instructions.

Once your team is assembled, you arm it with a variety of powerful weapons, then head out in your Powered Battle Armor (PBA).

All of the missions take place outdoors on one of four worlds, at various times of day and under varying weather conditions. In bad weather in particular, you'll come to rely on your PBA for its infrared imaging and its drones, which can scout out the bad guys for you.

You can issue a variety of commands, and your squad will execute them to the letter. On one mission, we encountered a flaw in the game's artificial intelligence that caused our troops to run into canyon walls when their goal was on the other side (the idea of going around the obstacle did not occur to them). But for

the most part, your troops are smart. That's important, because once the shooting starts, things get hectic in a hurry.

Many of the missions end up in confusing, explosive fire-fights, so you may want to take toys like the SIR Mark IV and the Universal Backup along with you.

Controlling your movements can be awkward, because you have to use the *s* key and the eight keys surrounding it. Weapons control is easier: You aim and fire with the mouse.

Even though the game's "hi-res" mode is only 320-by-400, the image quality, especially of the varied terrain, is spectacular. The music and Q-Sound 3-D audio are impressive, to say the least.

Terra Nova is an exceptional game that combines frenetic, fast-paced action with real-time squad-level tactics. It doesn't get much better than this.

—Michael E. Ryan

IN AFTER HOURS

Terra Nova: A Little Bit of Everything

Terra Nova: Strike Force Centauri.....387

VR Headsets: Ready for Prime Time?

Forté VFX1 Headgear Virtual Reality System.....388

VictorMaxx CyberMaxx 2.0 Head-Mounted Display.....388

Virtual i-O Virtual i-glasses.....388

Quick Clips

Maurice Ashley Teaches Chess

Dinotopia: Living the Adventure

Arms, Armor, and Battles Vikings: The Strategy of

Ultimate Conquest.....392

A Classic Reborn

Sid Meier's Civilization II.....393

The 'Bots Are Back

Descent II.....393

VR Headsets: Ready For Prime Time?

Virtual reality is one of the most abused catchphrases of the day. Still, many gamers want to feel the rush of a completely immersive VR experience on their PCs. Thanks to these three headsets, some gamers—that is, those with lots of disposable income—can now do so.

VFX1 Headgear Virtual Reality System

Forte Technologies Inc.; 716-427-8595; <http://www.fortevr.com>. Circle 468 on reader service card.

★★★ \$995.00

Of the three headsets reviewed here, the VFX1 Headgear Virtual Reality System is the best looking and offers the most immersive VR experience. Unfortunately, the VFX1 is also the heaviest (at 2.5 pounds) and the most expensive, at \$995.

Resembling something out of *Rollerball*, the VFX1 has a unique flip-up visor that lets you view the real world without removing the headset. Flip the visor down and you are totally immersed in your virtual environment. The visor contains a pair of adjustable color LCD eyepieces. The headset also in-

cludes stereo headphones but lacks a volume control.

Installing the VFX1 was relatively easy, even though this was the only headset that required its own interface card. Once the card is installed, you must attach it to your video and sound cards using the included cables. The VFX1's setup utility allows you to calibrate the head tracking (which changes your point of view in a game based on your head movements), test the CyberPuck controller (described below), and adjust the optics for optimum viewing. The manual is well-written and contains two pages on how to use the VFX1 safely.

We tested the VFX1 with *Descent II*, *Heretic*, and *MechWarrior 2*. In each case, the VFX1's head tracking worked well and the optics and sound were good. The headset includes a unique controller, the CyberPuck, which lets you maneuver in games by twisting and tilting your wrist. Though difficult to master, the CyberPuck can be a good controller for *MechWarrior 2*.

—John Delaney



VFX1 HEADGEAR

CyberMaxx 2.0 Head-Mounted Display

VictorMaxx Technologies Inc.; 708-267-0007; <http://www.vmaxx.com>. Circle 469 on reader service card.

★★★ \$499.00

The CyberMaxx 2.0 Head-Mounted Display is the least expensive headset here, but it is also the least enjoyable to use, primarily because it is heavy and uncomfortable to wear for more than a few minutes. After one level of *Heretic*, we felt as if we



CYBERMAXX 2.0

were wearing a restraining device meant for Hannibal Lecter.

The headset, which contains two color LCD lenses and stereo headphones, is designed in such a way that nearly all its weight (1.3 pounds) is up front, unlike the VFX1, whose weight is more evenly distributed. VictorMaxx recommends that you adjust the headset to your forehead, but with even slight head movements, the whole assembly ends up being supported by your nose (not a pleasurable experience).

The CyberMaxx is easy to install. You simply attach the included cable assembly to a serial port, your video and sound cards, and the headset. You can then install the software and load the patch files necessary to use the CyberMaxx with your favorite games.

In *Descent*, *DOOM II*, and *Heretic*, we found the Cyber-

Maxx's head tracking slow and jerky, although the image and sound quality were adequate. This system does have several handy features, such as brightness and tint knobs, a volume control on the power pack (a 1-pound box that clips to your belt), and a knob for adjusting the distance between the lenses. An additional switch allows you to select from five different resolution modes.

We also tested VictorMaxx's VIR one (\$120), a cool wireless (infrared) joystick that lets you control games from up to 15 feet away. When used with the CyberMaxx, however, the cable assembly prevents you from moving that far from the PC.

—JD

Virtual i-glasses

Virtual i-O Inc.; 206-382-7410; <http://www.vio.com>. Circle 470 on reader service card.

★★★ \$599.00

The Virtual i-glasses bring a whole new look and feel to the world of VR headsets. This was the most comfortable headset in the group and offered the best combination of performance and optic and sound quality. With a recently lowered price of \$599, the i-glasses are also considerably less expensive than Forte's VFX1.

The i-glasses pack two color LCD lenses and stereo headphones into a lightweight (8 ounces), comfortable package. One of the most useful features is the video mute button, which, when activated, allows you to see right through the lenses into the real world. The video mute, volume control, and 3-D mode switches are all conveniently located on the right side of the headset. The i-

Introducing...

\$44⁹⁹*

EACH PACK

COREL SUPER TEN SERIES

Each pack includes ten great titles
at one low price!

From Corel,
the world leader
in Windows®
graphics software.

The Corel Super Ten Series—bringing you the hottest titles from our best-selling
Corel CD HOME and Corel Professional Photos on CD-ROM multimedia lines.

INDIVIDUAL COREL CD HOME
TITLES ALSO SOLD SEPARATELY
\$19⁹⁹*

Inside the Corel Super Ten Kids
Entertainment Pack there's a
whole cast of wacky cartoon
characters and fascinating facts
just waiting to be discovered.
Keeping your child entertained and
enlightened has never been
easier—or more fun! For kids ages
3 to 14.

COREL SUPERTEN KIDS ENTERTAINMENT PACK

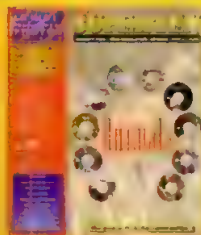


COREL SUPERTEN ENTERTAINMENT AND REFERENCE PACK



There's something for everyone in
the Corel Super Ten Entertainment
and Reference Pack. So whether
you want to check out a movie,
browse the classics or surf the Net,
this super-value pack adds up to an
unbeatable home entertainment
and reference resource.

COREL SUPERTEN ROYALTY-FREE HIGH-RESOLUTION ANIMALS PHOTO PACK



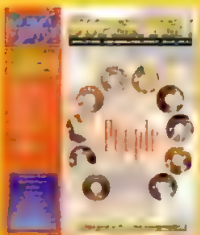
The Corel Super Ten Animals Pack
lets you explore the beauty and
majesty of the animal kingdom
from the comfort of your desktop.
Featuring 1,000 royalty-free, high-
resolution photos in stunning
color, it's the perfect screen saver
and photo library pack for animal
lovers everywhere.

COREL SUPERTEN ROYALTY-FREE HIGH-RESOLUTION SELECT PHOTO PACK



Imagine always having the perfect
photo right at your fingertips. The
Corel Super Ten Select Pack
offers a truly unique selection of
1,000 best-selling, royalty-free,
high-resolution images in one
value-packed box. Now you can
have a different screen saver
every day of the year!

COREL SUPERTEN ROYALTY-FREE HIGH-RESOLUTION PEOPLE PHOTO PACK



Ranging from modern-day fashion
models to ancient lost tribes, the
Corel Super Ten People Pack
showcases the fascinating diversity
of the human race. This collection
of 1,000 royalty-free, high-
resolution photos offers a
convenient photo library for a wide
variety of presentation needs.

COREL SUPERTEN ROYALTY-FREE HIGH-RESOLUTION ART PHOTO PACK



You will be captivated by the Corel
Super Ten Art Photo Pack's
memorable compilation of 1,000
royalty-free, high-resolution
photos—perfect for use in ads,
brochures, presentations and more.
It's like having your own art gallery
on CD-ROM!

INDIVIDUAL PHOTO CD TITLES
ALSO SOLD SEPARATELY

Enter the Corel \$3,000,000 World Design Contest!
(September '95 to July '96)
To receive a fixed copy of the contest rules and an entry
form, please call 1-613-728-0826 ext. 3080.
Document # 1125 To leave a message 1-613-728-0826
ext. 81609 To send a fax 1-613-728-2891



1-800-555-6255

*US\$ plus applicable taxes.

<http://www.corel.com>
Call now for latest literature!
1-613-728-0826 ext. 1080
Document # 1040

CIRCLE 314 ON READER SERVICE CARD

Corel is a registered trademark of Corel Corporation. All Movie Guide is a trademark of Matrix Software Inc. Bernard of Hollywood is a trademark of Renaissance Roads Productions, Inc. and is used under license. Blue Tortoise, Green Bear, Red Rhin and Yellow Hippo are trademarks of Alan Rogers. Herman is a registered trademark of Jim Ungel/Jewelry Trains and NIN-N Toy Makers are trademarks of Hoffman Associates Inc. Barons is a trademark of Barons Educational Series, Inc. Windows is a registered trademark of Microsoft Corporation. Macintosh is a registered trademark of Apple Computer, Inc. All product and company names are trademarks or registered trademarks of their respective companies.

Too Real for the Office

PC Magazine September 26, 1995

UPGRADE TO VMD 3D SPEAKERS.

- Creates dynamic 3D surround sound from only two speakers.
- Patented **SRS** (●) 3D sound technology as used by Packard Bell, Sony, RCA, and others.
- Acoustically superior wood enclosures.
- 35 watts of amplification.
- Incorporates four high-performance Neo-Radial™ speaker drivers.
- Shielded speaker drivers.
- Works with all PC sound cards and Macintosh computers.
- Easy to install.



NUREALITY

1-800-501-8086

714-442-1080



e-mail us at: sales@nureality.com
web site at: <http://www.nureality.com>

Technical Specs for those who care

Input sources: Max: 2 V p-p, **Impedance:** 100k Ohm bridging **Connector:** Stereo mini
Amplifier: 35 watts total audio amplification 10 watts true RMS, (17 watts p-p) per channel
Drivers: Four Aurasound™ Neo-Radial™ shielded speaker drivers, **Frequency Response:** ±3db, 125Hz-15KHz, **Power:** 12 VAC @1.8A, 50-60Hz. (transformer included), **Dimensions:** Size 9.40"h x 4.75"w x 8.62"d, **Weight:** 9lbs

Wood cabinets

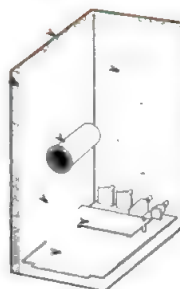
Two Shielded speaker drivers
Size engineered for ultimate sound reproduction

Bass boosting port hole

Thermo engineering

SRS (●)

Integrated Amp



CIRCLE 232 ON READER SERVICE CARD

MOVING?

Please write to: PC Magazine, P.O. Box 54093, Boulder, CO 80321. Include your mailing label from a recent issue of PC Magazine for faster service. Please allow up to 60 days for change of address to take place.

The Best Products for Internet Graphics and Publishing!

COREL WEB.DATA

The 32-bit Database Publisher For The Internet!

- ⇒ Publish data directly to the Internet
- ⇒ Create up-to-date online stock reports, catalogs, phone lists and much more
- ⇒ Format and publish information quickly and easily
- ⇒ No HTML knowledge required

\$94⁹⁷

For Windows[®] 95 and Windows NT[™]



COREL WEB.GALLERY

Over 7,500 Internet-Ready Clipart Images!

- ⇒ Over 7,500 Internet-ready clipart images in GIF or JPEG formats
- ⇒ Visual file manager makes it easy to preview, organize and access all of your images
- ⇒ Full-color reference manual included

\$63⁸³

For Windows[®] 3.1x. Runs on Windows[®] 95 and Windows NT[™]



COREL Xara!

Internet MANIA

Fast, Easy and Amazing 32-bit Graphics!

- ⇒ Powerful and flexible vector and bitmap illustration
- ⇒ Ultra-fast redraw
- ⇒ Drag and drop fonts, clipart, textures and more!

For Windows[®] 95, Windows NT[™] and Windows[®] 3.1x

\$186⁷⁸

\$21⁸⁵



from the makers of CorelDRAW



The easiest way to surf and gather information on the Internet

- ⇒ 8 powerful utilities
- ⇒ Over 400,000 Internet site directory listings
- ⇒ Home Page Author, Personal Stock Ticker, Corel FTP and more!

For Windows[®] 95 and Windows NT[™] 3.51 or higher

The Web Has Never Looked So Good!

CIRCLE 041 ON READER SERVICE CARD



COMPUTER DISCOUNT WAREHOUSE
800-279-4CDW



http://www.cdw.com
Call now for faxed literature!
1-613-298-0201
Document # 1100

© 1997 Corel Corporation. All rights reserved. Corel, the Corel logo, Xara!, and Internet Mania are either registered trademarks or trademarks of Corel Corporation. Microsoft, Windows, and Windows NT are either registered trademarks or trademarks of Microsoft Corporation. All other names are the property of their respective owners.



Simply the Best.

If you're looking to create stunning 3D graphics, eye popping animations, complete 3D on-line worlds, or unique 3D flying logos—we'd like to suggest **Visual Reality 2.0**

We've included a **Universal Animation System** that let's you ani-mate anything you can imagine. With our **Free Form Modeling** system you can



bend, twist, stretch—even fatten objects. With **2+ Gigabytes** of pre-built 3D worlds, hundreds of 3D models, thousands of materials and hundreds of video clips, you have an entire "studio backlot" ready to drag-and-drop.

Visual Reality 2.0 is a true 32-bit application and is ready to run under **Windows 3.1**, **Windows*95** or **Windows NT**. **Visual Reality 2.0** supports VRML for creating internet worlds. **Visual Reality 2.0** is tightly packed on to **seven CD's** and is selling for an estimated street price under \$200. Just call

1.800.669.7318

<http://www.3dplanet.com>

Compuserve **GO VISSOFT**

CIRCLE 250 ON READER SERVICE CARD

Copyright © 1995 Visual Software, Inc.
All other trademarks are registered trademarks of their respective owners.

Universal Animation

Objects Bend, Twist, Stretch, Fatten
Full Hierarchical Linking
Full 3D Morphing
Lights Color, Intensity, Location
Materials Transform, Bump Height
Reflection

Universal Effects

Rotoscoping for water and fire
Full Color Projector Lights
Graphical Plot Edit Channel Editor
Ease To, Ease From
Selective Lighting
Linking of Cameras, Lights and Targets
Field Rendering or Frame-By-Frame

Free Form Modeling

3D Morphing for Hybrid Objects
Push/Pull with Surface Tension
Mesh Commands to Smooth Jagged
Unlimited Undo
Unlimited Font
Stretch Along Paths
Font Deformations
Dozens of Bevels

2+ Gigabytes of Data

9 3D Worlds
Orbit City
Northern Castle
Jurassic Adventure
Starter Pack (6 Worlds)
Visual Energy AT's
500 Business Objects
1,000 Textures and Materials
300 Textures for Professionals

**Windows
Stellar**



★★★★
Publish 1986



**Win95
READY**



Sales Fax 818/683.3737
818/683.7000

After Hours

glasses can be worn with or without a clip-on visor. Even with visor in place, however, the i-glasses do not completely immerse you in your VR world. According to Virtual i-O, that's a good thing, as it helps minimize headaches

programs for calibration. The CD-ROM has several text files that will help you take full advantage of the i-glasses' 3-D capabilities when running different games.

Using the i-glasses with Descent II, Heretic, and Mech-

Warrior 2, we found the head tracking to be consistently smooth and responsive. The stereoscopic image was excellent on all three games, although text (scores, status messages) is nearly



VIRTUAL I-GLASSES

impossible to read, as it is with the other two headsets. Since the i-glasses don't include a game controller, we hooked up our VR controller of choice, the Spaceball Avenger (\$129.99, Spacetec IMC Corp., 800-585-6548). This combination worked exceptionally well with Descent II.

and other physical discomforts associated with VR headsets. We found the installation of the i-glasses to be quite simple. A provided junction box with cabling connects the i-glasses to serial, sound, and video ports on the back of the PC. The i-glasses software includes installation and utility

—JD

QUICK CLIPS

Recommended
It's Your Call
Not Recommended

▲ Maurice Ashley Teaches Chess

Using sports analogies, video clips, and cartoonlike animations, this extremely instructive title teaches chess basics and even some advanced strategies. A 29-year-old master, Ashley proves to be a most effective teacher. \$35; Davidson & Associates/Simon & Schuster; 800-457-8357.

▲ Dinotopia: Living the Adventure

Probably a must-have for fans of James Gurney's *Dinotopia* (especially for kids ages 6 to 10), this adventure game has good graphics, fun puzzles, and dinosaurs. Now, how can you go wrong with that combo? \$50; Turner Interactive; 800-294-0022.

? Arms, Armor, and Battles

Third in a series of steel engraving collections, this impressive CD-ROM holds 297 royalty-free military images, mostly from the 19th century. \$49.95; Judson Rosebush Co.; 212-581-3000.

▼ Vikings: The Strategy of Ultimate Conquest

A good idea with a good narrator (Michael Dorn), but it suffers from confusing gameplay, dated graphics, and repetitive dialog. \$39.95; GT Interactive Software; 212-726-6500.

A Classic Reborn

Sid Meier's Civilization II

MicroProse Software Inc.; 800-879-7529; <http://www.microprose.com>.

Circle 471 on reader service card.

★★★★   \$50.00

Ask any serious game player to name the greatest game of all time and the odds are pretty good that you'll hear Sid Meier's Civilization mentioned more than a few times. Since its initial release in 1991, Civ (as it is affectionately known) has sold more than 850,000 copies and ended more than a few marriages by drawing players in for days at a time, often at the expense of food, sleep, and just about everything else.

As if that weren't enough, now there's Civilization II, a sequel that is superior to the original in every conceivable way.

In case you're unfamiliar with Civ, the basic premise is as follows: You begin the game in the year 4,000 B.C. as the leader of a group of settlers. With a limited knowledge of such basic technologies as irrigation, you nevertheless begin to build a nation and to discover the world around you. The goal of the game is either to expand from this point and ultimately conquer the world or to advance your tribe scientifically in order to become the first to venture beyond Earth and colonize the Alpha Centauri star system—no easy task in either case. And along the way, you must build cities, choose new technologies to study, defend against other nations, and negotiate with them for your mutual benefit.

Civilization II takes the

same idea and enhances it with much better graphics, more technologies (such as seafaring and refrigeration), more military units (marine, helicopter, AEGIS cruiser), and far more diplomatic options. Civ II also offers more city improvements and Wonders of the World, each of which provide your tribe with some specific benefit. The artificial intelligence is greatly enhanced, and a new difficulty level, Deity, has been added.

Like multiplayer CivNet,

Civ II includes a decent map editor, which you can use to design custom scenarios for Civ II. Unlike CivNet, however, Civ II offers no multiplayer capabilities. We're sure some players will complain about that, but we were so impressed with Civ II's new look, new features, and new AI that we scarcely noticed the omission.

In fact, if you don't already own this game, you should se-



riously consider putting this magazine down, going to the nearest software dealer, and buying it. We'll still be here when you get back.

—Shane Mooney

The 'Bots Are Back

Descent II

Interplay Productions; 714-553-6655; <http://www.interplay.com>. Circle 472 on reader service card.

★★★★    \$50.00

Last year, Interplay Productions' Descent wowed gamers with its 360-degree, 3-D action. In fact, we were so impressed, we gave the game an award for technical excellence for its outstanding graphics engine. Although Descent II does little to advance the state of the art in gaming, it certainly offers more of a good thing.

In case you're actually interested in the story, it boils

down to this: The evil, nasty robots that you thought you vanquished in the original game are back in a big way. So your mission has been extended so you can eliminate the rest of these annoying automatons by infiltrating their mines on six different worlds (funny how the robots never seem to run out of mines to hide in, huh?).

With this charter in hand, you take off to each mine and proceed to dust off as many robots as you can find. Descent II includes 30 new levels and 30 new robots. The robots in the original were less frightening than your average rhombus, but the Descent II bad guys

are more sinister-looking and far more dangerous. Some even steal your weapons and energy, but it was the four-clawed, chomping robot that terrorized us the most.

The game also includes ten

new weapons and a wealth of new features and options, including a Guide-Bot. This friendly little fellow helps you find your way through each mine. You'll come to thank this 'Bot, because the automap is just as confusing as it was in the original game.

Descent II runs in several resolutions, ranging from 320-by-200 to 800-by-600. You'll need some heavy-duty hardware, however, to run the game at the highest setting. Although the game is designed to take advantage of the Diamond Edge 3D accelerator, we found the 800-by-600 mode sluggish even on a Pentium/100 equipped with that card. It took a Pentium/166 (with a 2-D video card) to run the game well in 800-by-600 mode.

We experimented with several controllers while testing Descent II, but found the combination of the venerable CH FlightStick Pro and the new CH Pro Throttle (\$189.95, CH Products, 619-598-2518) unbeatable. Except when we ran into the Boss Robots, that is, which were maddeningly difficult to destroy.

—MER



From the world leader in Windows® graphics software

THE BEST IN 32-BIT GRAPHICS POWER FOR EVERYONE!



Includes:

- **COREL DRAW® 6**
Illustration and Page Layout
- **COREL PHOTO-PAINT® 6**
Photo Editing and Image Manipulation
- **COREL DREAM 3D®**
3D Modeling and Rendering
- **COREL MOTION 3D®**
3D Animation
- **COREL PRESENTS® 6**
Business and Multimedia Presentations

New Highlights:

- Increased speed and power
- Multiple Document Interface (MDI)
- Fully customizable toolbars, hotkeys, and menu structure and status bar
- Greater ease of use with Wizards and Tool Palettes
- Precision to 0.1 micron (254,000 DPI)
- New tools: polygon, lasso, penning, spiral, graph paper, vector text, connector lines and regular dimension lines
- 3D modeling, rendering and animation
- Natural media brush, sketchy, felt tip and more
- AM and PLC file output
- Business and customer presentation applications
- CIE 2.0 in-place editing environment

from the world leader in Windows graphics software

Corel Print House™

The Easy All-in-One Graphics Powerhouse

Incredible Value!

- 5,000 stunning clipart images
 - 1,000 catchy phrases
 - 1,000 fantastic photos
 - 1,000 professionally designed and easy-to-use samples
 - 100+ top-quality fonts
- Easy to Use!**
- Create great-looking projects in a few easy steps
 - Intuitive interface
 - Drag-and-drop clipart and special effects

**Corel Print House—
the best-selling
Windows® 95
software
application!**
(PC DATA, Jan. '96)

CorelDRAW 6

The Best in 32-Bit

Powerful!

- Designed exclusively for Microsoft Windows 95
 - State-of-the-art graphics engine
 - Power, precision and 32-bit speed
 - Fully customizable user interface
 - Multiple Document Interface (MDI)
- Incredible Value!**
- Fully featured applications for illustration, photo-editing and bitmap creation, 3D rendering, animation and multimedia presentations
 - OLE 2.0 support, drag and drop between applications
 - Industry leading drawing, editing and text handling capabilities

Corel Graphics Pack

Requires Windows 95

The 32-Bit Wizard-Driven Total Graphics Solution!

Easy to Use!

- All-in-one graphics solution!
 - Ideal for graphics, presentations, photo touch-ups, 3D graphics, charts and diagrams, space planning, family trees, stationery, calendars, home page creation, greeting cards and much more!
 - Wizard-style user interface
 - Step-by-step help file
 - Choose from over 50 tasks
- Powerful!**
- State-of-the-art 32-bit CorelDRAW engine
 - 32-bit power and precision

Enter the Corel \$3,000,000 World Design Contest! (September '96 to July '96)
To receive a boxed copy of the contest rules and an entry form, please call:
1-613-728-8826, ext. 3000, Document # 1125. To leave a message:
1-613-728-8826, ext. 81000. To send a fax: 1-613-728-2801.

Corel, CorelDRAW and Corel Print House are either trademarks or registered trademarks of Corel Corporation in Canada, the United States and in other countries.

Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Since 1982
ComputAbility
Consumer Electronics
Call Now!

1-800-554-1635

US\$ plus applicable taxes and shipping.

CorelDRAW 5 to
CorelDRAW 6 upgrade

\$226
CorelDRAW 6 \$429*

Corel Print House

\$29
Special price while quantities last.

Corel Graphics Pack

\$97
Special price while quantities last.

KUR-0209-US



http://www.corel.com
Call now for boxed literature!
1-613-728-8826 ext. 3000

Advertisers' Index COMPANIES

Reader Service No.	Advertiser	Page
032	3D/Eye Inc.	240 W95
127	3M Company	94-95
087	Acer America	88-90
035	Acer America	149
034	Acer America	168
218	Adaptec	84
226	ADI Systems Inc.	61
252	Adobe Systems Inc.	211
064	Advanced Logic Research	261 W95
075	Advanced Micro Devices	20-21
162	American Power Conversion	252 W95
235	AMS	43
020	Apricorn	237 W95
336	ARLINGTON COMPUTER PRODUCTS	306
055	Avery Dennison	254 W95
070	BBN Planet	138
*	Boxlight	268 W95
222	Bull Express	325
029	BusLogic	289 W95
292	Caere Corporation	6
*	Canon, U.S.A.	178-179
*	Clarix Corporation	302-303 W95
*	Compaq Computer Corporation	113
*	Compaq Computer Corporation	201-203
387	CompuLink Research	326
025	CompUSA Direct	348-349
274	CompuServe	275
364	Computer City	266 W95
159	COMPUTER DISCOUNT WAREHOUSE	332-333
318	COMPUTER DISCOUNT WAREHOUSE	334-335
360	COMPUTER DISCOUNT WAREHOUSE	336-337
369	Connectix	223
017	Connectix	265 W95
332	Corel Corporation	26-27
358	Corel Corporation	115
322	Corel Corporation	176
011	Corel Corporation	255 W95
103	Corel Corporation	287 W95
044	Corel Corporation	386
314	Corel Corporation	389
041	Corel Corporation	391
042	Corel Corporation	394
095	Creative Labs	151
*	Crosstalk/Attachmate	244
329	CTX International	72
*	Dell Computer Corporation	C5-C8
*	Dell Computer Corporation	32-33
*	Dell Computer Corporation	68
*	Dell Computer Corporation	164-165
*	Dell Computer Corporation	284 W95
316	Delrina Technology	158-159
388	Digital Equipment Corp.	58-59
*	EIZO NANO Technologies, Inc.	214
*	Epson America	10-11
240	ESRI	218
090	Everex Systems	288 W95
014	First Source International	318-319
089	FOSA Computer	317
*	Gateway 2000	121-129
026	Graphsoft, Inc.	294 W95
391/138	H.Co Memory Upgrades	313

Reader Service No.	Advertiser	Page
062	HARTFORD COMPUTER GROUP	323
067	Helix Software Co.	301 W95
*	Hewlett Packard	30
*	Hewlett Packard	76-77
*	Hewlett Packard	79
*	Hewlett Packard	117
*	Hewlett Packard	188-189
073	Hewlett Packard-Colorado Memory Systems	55
143	Hitachi	262 W95
082	Hitachi PC Corporation	146-147
*	IBM Corporation	167
*	IBM Corporation	177
*	IBM Corporation	181
*	IBM Corporation	195
*	IBM Corporation	215
390	In Focus Systems	239 W95
219	Insight Direct	320-321
*	Intel Corporation	119
*	Intel Corporation	142
040	Intergraph Corporation	13
050	Internet Direct	137
002	Iomega Corporation	229 W95
170	KDS USA	274 W95
106	Kingston Technology	35
334	Kodak Digital Science Solutions	57
019	L.A. Trade	340
*	Logitech	249 W95
*	Lotus Development Corporation	46-47
006	Luckman Interactive	131
009	Luckman Interactive	133
072	Macromedia	278-279 W95
039	MAG InnoVision	16-17
365	Manugistics Inc.	297 W95
344	Mapping Information Systems	236 W95
068	Maximux Computers	257 W95
299	McAfee Associates, Inc.	180
283	MEGAHAUS	327
173	Memory Express	277 W95
004	MGI Software	228
058	Micro Focus	5
855	Micro Solutions Computer Products	329
317	MicroField Graphics	272 W95
*	Micrografix	67
214	MicroHelp Inc.	96
119	Micron Electronics	24-25
164	Micron Electronics	48A-48F
370	Micron Electronics	49
013	Micron Electronics	153-156
*	Microsoft	2-3
*	Microsoft	52-53
010	Midwest Computer Works	310-311
398	Midwest Micro	342
054	Mitsuba Corporation	276 W95
280	Mitsubishi Electronic America, Inc.	292 W95
157	NEC Technologies	1
*	NEC Technologies	C2-4
153	NEC Technologies	172-173
155	NEC Technologies	80-81
217	NEC Technologies	338-339
154	NEC Technologies	206-207
327	NECX	331

Reader Service No.	Advertiser	Page
036	Newcom	23
078	NewSoft, Inc.	269 W95
*	Nokia	86
*	Novell, Inc.	70-71
232	NuReality	390
*	Okidata	197
*	Palm Computing Inc.	205
047	PC Connection	328
080	PC Power & Cooling	92
199	PC Zone	314-315
092	PCs Compleat	344-345
268	PCs Compleat	346-347
393	Peachtree Software	234 W95
171	PictureTel	271 W95
270	Pinnacle Micro	14-15
188	Pipeline USA	293 W95
193	Play Inc.	231 W95
131	Portrait Display Labs	296 W95
148	Primavera Systems	62
056	Pro Direct	308
290	ProCD	250-251 W95
083	Procomm Plus	220
264	ProGen Systems	304 W95
*	Publishing Perfection	285 W95
309	S.A.G./Storage Solutions	45
033	Samsung	182
248	Simple Technologies	82
030	Smith Micro Software, Inc.	300 W95
346	SoftQuad Inc.	141
043	SPSS, Inc.	309
023	Sun Microsystems	104-105
132	Sun Microsystems	64-65
335	Sun Microsystems	134-135
053	Swan Technologies	232-233 W95
308	Symantec Corporation	18
112	TDK Systems Inc.	295 W95
246	Texas Instruments	110-111
368	Texas Instruments	190
305	Texas Instruments	343
066	Tiger Software/BLOC Publish. Corp.	258-259 W95
*	Toray	305 W95
379	Toshiba America	216-217
003	Truevision, Inc.	299 W95
*	Unisys Corporation	98-99
*	US Robotics Inc.	38 W95
*	US Robotics Inc.	242-243
051	USA Flex	341
284	Vertisoft	264 W95
243	Viagrafix	241 W95
118	ViewSonic	162
*	Visio	226-227
065	VisionTek	283 W95
250	Visual Software	392
052	VocalTec Inc.	280 W95
085	Winbook	75
163	Xerox Corporation	28
018	XI Computer Corp.	291 W95
*	Xircom	246-247 W95
303	ZDI	97

* No Reader Service #. Please Call Advertiser For Information.

Advertisers' Index PRODUCTS

Reader Service No.	Company	Product	Page
ACCELERATOR BOARDS			
*	Intel Corporation	Overdrive Processor	119
*	Intel Corporation	Intel Tech Series	142
ADD-ON BOARDS			
391/138	H.Co Memory Upgrades	Memory, PCMCIA	313
AUDIO BOARDS			
095	Creative Labs	Sound Blaster	151
CD-ROM			
855	Micro Solutions Computer Products	CDROM	329
232	NuReality	3D Sound Enhancement	390
CHIPS/PROCESSORS			
075	Advanced Micro Devices	Microprocessor	20-21
391/138	H Co Memory Upgrades	Memory, PCMCIA	313
*	Intel Corporation	Overdrive Processor	119
*	Intel Corporation	Intel Tech Series	142
106	Kingston Technology	Kingston Memory	35
019	L.A. Trade	Memory	340
248	Simple Technologies	Memory	82
COMMUNICATIONS SOFTWARE			
316	Deirina Technology	CommSuite	158-159
299	McAfee Associates, Inc.	WebScan	180
083	Procomm Plus	ProComm Plus for Window 3.0	220
308	Symantec Corporation	Norton Antivirus and Norton Utilities	18
COMPATIBLE KEYBOARDS			
*	IBM Corporation	Aptra	195
398	Midwest Micro	Desktop Systems	342
COMPUTERS/COMPATIBLES			
035	Acer America	Aspire	149
087	Acer America	Acer Direct	88-90
336	ARLINGTON COMPUTER PRODUCTS	Peripherals	306
222	Bull Express	Bull Express	325
*	Compaq Computer Corporation	PCs	113
*	Compaq Computer Corporation	Prolinea	201-203
387	CompuLink Research	Infinity	326
025	CompUSA Direct	Mail Order	348-349
159	COMPUTER DISCOUNT WAREHOUSE	Hardware, Software, Peripherals	332-333
318	COMPUTER DISCOUNT WAREHOUSE	Hardware, Software, Peripherals	334-335
360	COMPUTER DISCOUNT WAREHOUSE	Hardware, Software, Peripherals	336-337
*	Dell Computer Corporation	Dell Desktops and Notebooks	C5-C8
*	Dell Computer Corporation	Platinum	164-165
*	Dell Computer Corporation	Dell Dimension	32-33
*	Dell Computer Corporation	Dell Dimension XPS 133C	68
388	Digital Equipment Corp	Digital PCs	58-59
014	First Source International	Memory, Notebooks, Peripherals	318-319
089	FOSA Computer	Portables	317
*	Gateway 2000	PCs	121-129
062	HARTFORD COMPUTER GROUP	Mail Order	323
*	Hewlett Packard	HP Vectra 500 PCs	117
*	Hewlett Packard	HP Vectra PCs	76-77
*	Hewlett Packard	HP OmniBook	79
*	IBM Corporation	IBM Commercial Services	167
219	Insight Direct	Mail Order	320-321
164	Micron Electronics	Micron PCs	48A-48F
370	Micron Electronics	Micron PCs	49
010	Midwest Computer Works	PCs	310-311
217	NEC Technologies	NEC Select	338-339
153	NEC Technologies	Versa	172-173
327	NECX	Mail Order	331
047	PC Connection	PCs	328
199	PC Zone	Mail Order	314-315
092	PCs Complete	Notebooks	344-345
268	PCs Complete	Notebooks	346-347
309	S.A.G./Storage Solutions	Pentium PC	45
379	Toshiba America	Notebooks	216-217
*	Unisys Corporation	Unisys PCs and Servers	98-99
051	USA Flex	Desktop Systems	341
DISK BACKUP & TAPE DRIVES			
127	3M Company	3M LS-120	94-95
855	Micro Solutions Computer Products	Tape Backup	329
DISPLAYS/MONITORS			
034	Acer America	Open Monitors	168
226	ADI Systems Inc.	Monitors	61
222	Bull Express	Bull Express	325
329	CTX International	Monitors	72
*	EIZO NANO Technologies, Inc.	Monitors	214
039	MAG InnoVision	MAG InnoVision Monitors	16-17
010	Midwest Computer Works	Monitors	310-311
*	NEC Technologies	Monitors	C2-4
157	NEC Technologies	Monitors	1
155	NEC Technologies	NEC PPG	80-81
*	Nokia	Monitors	86
118	ViewSonic	Monitors	162
EDUCATIONAL SOFTWARE			
358	Corel Corporation	WordPerfect	115
322	Corel Corporation	Visual CADD	176
332	Corel Corporation	Office Professional	26-27
044	Corel Corporation	Learning Series	386
314	Corel Corporation	Super 10 Pack	389
041	Corel Corporation	Corel Internet Combo	391
042	Corel Corporation	Corel Graphics Combo	394
ENTERTAINMENT SOFTWARE			
274	CompuServe	On-Line Services	275
358	Corel Corporation	WordPerfect	115
322	Corel Corporation	Visual CADD	176
332	Corel Corporation	Office Professional	26-27
044	Corel Corporation	Learning Series	386
314	Corel Corporation	Super 10 Pack	389
041	Corel Corporation	Corel Internet Combo	391

Reader Service No.	Company	Product	Page
042	Corel Corporation	Corel Graphics Combo	394
FAX SOFTWARE			
316	Deirina Technology	CommSuite	158-159
083	Procomm Plus	ProComm Plus for Window 3.0	220
FAX/MODEM			
327	NECX	Mail Order	331
FLOWCHARTING SOFTWARE			
*	Micrografix	ABC Graphics Suite	67
*	Microsoft	Microsoft Project	2-3
*	Visio	Visio 4.0	224-225
GRAPHICAL INTERFACE			
035	Acer America	Aspire	149
087	Acer America	Acer Direct	88
GRAPHICS SOFTWARE			
292	Caere Corporation	OmniPage Pro	6
358	Corel Corporation	WordPerfect	115
322	Corel Corporation	Visual CADD	176
332	Corel Corporation	Office Professional	26-27
044	Corel Corporation	Learning Series	386
314	Corel Corporation	Super 10 Pack	389
041	Corel Corporation	Corel Internet Combo	391
042	Corel Corporation	Corel Graphics Combo	394
040	Intergraph Corporation	Imagineer	13
*	Visio	Visio 4.0	226-227
250	Visual Software	VRII	392
HAND-HELD PC'S			
*	Hewlett Packard	HP OmniBook	79
*	Palm Computing Inc.	Pilot Organizer	205
HARD DRIVES			
219	Insight Direct	Mail Order	320-321
283	MEGAHAUS	Mass Storage	327
056	Pro Direct	Mail Order	308
HARDWARE			
075	Advanced Micro Devices	Microprocessor	20-21
*	Canon, U.S.A.	Canon Color Laser Printers	178-179
*	Compaq Computer Corporation	PCs	113
*	Compaq Computer Corporation	Prolinea	201-203
387	CompuLink Research	Infinity	326
095	Creative Labs	Sound Blaster	151
*	Dell Computer Corporation	Platinum	164-165
*	Dell Computer Corporation	Dell Dimension	32-33
*	Dell Computer Corporation	Dell Dimension XPS 133C	68
388	Digital Equipment Corp	Digital PCs	58-59
*	Epson America	Epson Color Ink Jet Printers	10-11
*	Hewlett Packard	HP Vectra 500 PCs	117
*	Hewlett Packard	HP Color LaserJet 5 Printer	188-189
*	Hewlett Packard	HP Color LaserJet 5 Printer	30
*	Hewlett Packard	HP Vectra PCs	76-77
*	Hewlett Packard	HP OmniBook	79
082	Hitachi PC Corporation	Notebooks	146-147
219	Insight Direct	Mail Order	320-321
106	Intel Corporation	Intel Tech Series	142
334	Kingston Technology	Kingston Memory	35
283	Kodak Digital Science Solutions	Kodak Camera	57
398	MEGAHAUS	Mass Storage	327
327	Midwest Micro	Notebooks, Desktops, Peripherals	342
232	NECX	Mail Order	331
*	NuReality	3D Sound Enhancement	390
*	Okidata	OL600E	197
*	Palm Computing Inc.	Pilot Organizer	205
080	PC Power & Cooling	Power Protection/Cooling Devices	92
199	PC Zone	Mail Order	314-315
056	Pro Direct	Mail Order	308
033	Samsung	Samsung Notebooks	182
248	Simple Technologies	Memory	82
132	Sun Microsystems	Sun Ultra Enterprise Servers	64-65
305	Texas Instruments	TI Printers	343
*	Unisys Corporation	Unisys PCs and Servers	98-99
118	ViewSonic	Monitors	162
INTERNET			
070	BBN Planet	Web Advantage	138
050	Internet Direct	Internet Server	137
006	Luckman Interactive	Web Commander	131
009	Luckman Interactive	Yellow Pages	133
*	Microsoft	Internet	52-53
346	SoftQuad Inc.	Hot Metal Pro	141
335	Sun Microsystems	Solaris	134-135
023	Sun Microsystems	Netra Server	104-105
303	ZDI	ZD Net	97
LABEL/FORM SOFTWARE			
292	Caere Corporation	OmniPage Pro	6
LAPTOP/PORTABLE COMPUTERS			
235	AMS	Notebooks	43
222	Bull Express	Bull Express	325
*	Compaq Computer Corporation	Compaq Catalog	201-203
025	CompUSA Direct	Mail Order	348-349
159	COMPUTER DISCOUNT WAREHOUSE	Hardware, Software, Peripherals	332-333
318	COMPUTER DISCOUNT WAREHOUSE	Hardware, Software, Peripherals	334-335
360	COMPUTER DISCOUNT WAREHOUSE	Hardware, Software, Peripherals	336-337
*	Dell Computer Corporation	Dell Desktops and Notebooks	C5-C8
*	Dell Computer Corporation	Platinum	164-165
014	First Source International	Memory, Notebooks, Peripherals	318-319
089	FOSA Computer	Portables	317
*	Gateway 2000	Notebooks	121-129
062	HARTFORD COMPUTER GROUP	Mail Order	323
*	Hewlett Packard	HP OmniBook	79
082	Hitachi PC Corporation	Notebooks	146-147
*	IBM Corporation	IBM Commercial Services	167
013	Micron Electronics	Micron Notebooks	153-156

Advertisers' Index PRODUCTS

Reader Service

No.	Company	Product	Page
119	Micron Electronics	Color Notebooks	24-25
010	Midwest Computer Works	Hardware	310-311
398	Midwest Micro	Notebooks	342
153	NEC Technologies	Versa	172-173
199	PC Zone	Mail Order	314-315
092	PCs Complete	Notebooks	344-345
268	PCs Complete	Notebooks	346-347
033	Samsung	Samsung Notebooks	182
246	Texas Instruments	TI Notebooks	110-111
358	Texas Instruments	TI Notebooks	190
379	Toshiba America	Notebooks	216-217
051	Unisys Corporation	Unisys PCs and Servers	98-99
085	USA Flex	Notebooks	341
085	Winbook	Winbook	75

LOCAL AREA NETWORKING

159	COMPUTER DISCOUNT WAREHOUSE	Hardware, Software, Peripherals	332-333
318	COMPUTER DISCOUNT WAREHOUSE	Hardware, Software, Peripherals	334-335
360	COMPUTER DISCOUNT WAREHOUSE	Hardware, Software, Peripherals	336-337
062	HARTFORD COMPUTER GROUP	Mail Order	323

MAIL ORDER

336	ARLINGTON COMPUTER PRODUCTS	Mail Order	306
387	Compaq Computer Corporation	Prolinea	201-203
025	CompuLink Research	Infinity	326
025	CompUSA Direct	Mail Order	348-349
159	COMPUTER DISCOUNT WAREHOUSE	Hardware, Software, Peripherals	332-333
318	COMPUTER DISCOUNT WAREHOUSE	Hardware, Software, Peripherals	334-335
360	COMPUTER DISCOUNT WAREHOUSE	Hardware, Software, Peripherals	336-337
014	First Source International	Memory, Notebooks, Peripherals	318-319
089	FOSA Computer	Portables	317
391/138	Gateway 2000	Mail Order	121-129
019	H Co Memory Upgrades	Memory, PCMCIA, Fax/Modem, LAN	313
283	IBM Corporation	IBM Commercial Services	167
019	IBM Corporation	Aptiva	195
283	L.A. Trade	Memory	340
119	MEGAHAUS	Mass Storage	327
010	Micron Electronics	Color Notebooks	24-25
217	Midwest Computer Works	Mail Order	310-311
047	NEC Technologies	NEC Select	338-339
092	PC Connection	Mail Order	328
268	PCs Complete	Notebooks	344-345
309	PCs Complete	Notebooks	346-347
051	S.A.G./Storage Solutions	Storage Solutions	45
051	USA Flex	Mail Order	341

MASS STORAGE

073	Hewlett Packard-Corvado Mem System	Mass Storage	55
283	MEGAHAUS	Mass Storage	327
855	Micro Solutions Computer Products	Tape Backup, CDROM, Disk Drive	329
309	S.A.G./Storage Solutions	Pentiums, Servers, Storage Solutions	45

MEMORY

014	First Source International	Memory, Notebooks, Peripherals	318-319
391/138	H Co Memory Upgrades	Memory	313
106	Kingston Technology	Kingston Memory	35
019	L.A. Trade	Memory	340
056	Pro Direct	Mail Order	308
248	Simple Technologies	Memory	82

MISCELLANEOUS

274	CompuServe	On-Line Services	275
058	Hewlett Packard	HP Color LaserJet 5 Printer	188-189
058	Hewlett Packard	HP Color LaserJet 5 Printer	30
058	Micro Focus	Programming Tools	5
058	Nokia	Monitors	86

MODEMS

327	NECX	Mail Order	331
036	Newcom	Fax/Modem	23
056	Pro Direct	Mail Order	308
056	US Robotics Inc.	Sportster v33.6	38

MULTIMEDIA

025	CompUSA Direct	Mail Order	348-349
369	Connectix	QuickCam	223
095	Creative Labs	Sound Blaster	151
062	HARTFORD COMPUTER GROUP	Mail Order	323
855	Micro Solutions Computer Products	Tape Backup, CDROM, Disk Drive	329
232	NuReality	3D Sound Enhancement	390
118	ViewSonic	Monitors	162

MULTIMEDIA SOFTWARE

070	BBN Planet	Web Advantage	138
358	Corel Corporation	WordPerfect	115
322	Corel Corporation	Visual CADD	176
332	Corel Corporation	Office Professional	26-27
044	Corel Corporation	Learning Series	386
314	Corel Corporation	Super 10 Pack	389
041	Corel Corporation	Corel Internet Combo	391
042	Corel Corporation	Corel Graphics Combo	394
250	Visual Software	VRIL	392

ON LINE DATABASE/SERVICES

274	CompuServe	On-Line Services	275
058	IBM Corporation	IBM InfoSage	177
058	IBM Corporation	IBM InfoSage	181
058	IBM Corporation	IBM InfoSage	215
058	Microsoft	Internet	52-53

OPERATING SYSTEMS

058	Microsoft	Internet	52-53
058	Novell, Inc.	GroupWise	70-71

OPTICAL PERIPHERALS

334	Kodak Digital Science Solutions	Kodak Camera	57
270	Pinnacle Micro	Optical Drives	14-15

ORGANIZATIONAL SOFTWARE

274	CompuServe	On-Line Services	275
-----	------------	------------------	-----

Reader Service

No.	Company	Product	Page
058	Microsoft	Microsoft Project	2-3
058	Visio	Visio 4.0	228-227

PC ACCESSORIES

232	NuReality	3D Sound Enhancement	390
-----	-----------	----------------------	-----

PC DIRECT

336	ARLINGTON COMPUTER PRODUCTS	Mail Order, Peripherals	306
222	Bull Express	Bull Express	325
387	CompuLink Research	Infinity	326
025	CompUSA Direct	Mail Order	348-349
159	COMPUTER DISCOUNT WAREHOUSE	Hardware, Software, Peripherals	332-333
318	COMPUTER DISCOUNT WAREHOUSE	Hardware, Software, Peripherals	334-335
360	COMPUTER DISCOUNT WAREHOUSE	Hardware, Software, Peripherals	336-337
089	FOSA Computer	Portables	317
391/138	H Co Memory Upgrades	Memory, PCMCIA, Fax/Modem, LAN	313
062	HARTFORD COMPUTER GROUP	Mail Order	323
219	Insight Direct	Mail Order	320-321
019	L.A. Trade	Memory	340
283	MEGAHAUS	Mass Storage	327
855	Micro Solutions Computer Products	Tape Backup, CDROM, Disk Drive	329
010	Midwest Computer Works	Mail Order	310-311
398	Midwest Micro	Notebooks, Desktops, Peripherals	342
217	NEC Technologies	NEC Select	338-339
327	NECX	Mail Order	331
047	PC Connection	Mail Order	328
199	PC Zone	Mail Order	314-315
092	PCs Complete	Notebooks	344-345
268	PCs Complete	Notebooks	346-347
056	Pro Direct	Mail Order	308
043	SPSS Inc.	Statistical & Windows Software	309
305	Texas Instruments	TI Printers	343
051	USA Flex	Notebooks, Desktops, Peripherals	341

PCMCIA

218	Adaptec	SCSI CD-Recordable	84
391/138	H Co Memory Upgrades	Fax/Modem, Flash, SRAM, Drives	313
058	US Robotics Inc.	Sportster v33.6	38

PERIPHERALS

095	Canon, U.S.A.	Canon Color Laser Printers	178-179
014	Creative Labs	Sound Blaster	151
014	Epson America	Epson Color Ink Jet Printers	10-11
014	First Source International	Memory, Notebooks, Peripherals	318-319
014	Gateway 2000	Peripherals	121-129
014	Hewlett Packard	HP Color LaserJet 5 Printer	188-189
014	Hewlett Packard	HP Color LaserJet 5 Printer	30
334	Kodak Digital Science Solutions	Kodak Camera	57
398	Midwest Micro	Peripherals	342
154	NEC Technologies	Printers	206-207
232	Nokia	Monitors	86
047	NuReality	3D Sound Enhancement	390
199	Okidata	OL600E	197
309	PC Connection	Peripherals	328
305	PC Zone	Mail Order	314-315
305	S.A.G./Storage Solutions	Pentiums, Servers, Storage Solutions	45
305	Texas Instruments	TI Printers	343

POWER PROTECTION

080	PC Power & Cooling	Power Protection/Cooling Devices	92
-----	--------------------	----------------------------------	----

PRESENTATION SOFTWARE

155	NEC Technologies	NEC PPG	80-81
-----	------------------	---------	-------

PRINTER ACCESSORIES

305	Texas Instruments	TI Printers	343
-----	-------------------	-------------	-----

PRINTERS

058	Canon, U.S.A.	Canon Color Laser Printers	178-179
058	Epson America	Epson Color Ink Jet Printers	10-11
058	Hewlett Packard	HP Color LaserJet 5 Printer	188-189
058	Hewlett Packard	HP Color LaserJet 5 Printer	30
154	NEC Technologies	Printers	206-207
305	Okidata	OL600E	197
051	Texas Instruments	TI Printers	343
051	USA Flex	Peripherals, Printers	341

PROGRAMMERS TOOLS UTILITIES

058	Micro Focus	Programming Tools	5
-----	-------------	-------------------	---

PROJECT MANAGEMENT SOFTWARE

058	Microsoft	Microsoft Project	2-3
148	Primavera Systems	Suretrak 1.5 and P3	62

REMOTE COMPUTING

058	Hewlett Packard	HP OmniBook	79
299	McAfee Associates Inc.	WebScan	180
058	US Robotics Inc.	Sportster v33.6	38

SERVERS

050	Internet Direct	Internet Server	137
309	S.A.G./Storage Solutions	Servers	45
132	Sun Microsystems	Sun Ultra Enterprise Servers	64-65
335	Sun Microsystems	Solans	134-135
023	Sun Microsystems	Netra Server	104-105
058	Unisys Corporation	Unisys PCs and Servers	98-99

SHAREWARE SOFTWARE

058	Lotus Development Corporation	Lotus SmartSuite	46-47
-----	-------------------------------	------------------	-------

SOFTWARE

252	Adobe Systems Inc.	Adobe PrintGear	211
274	CompuServe	On-Line Services	275
369	Connectix	QuickCam	223
316	Delrina Technology	CommSuite	158-159
240	ESRI	Map Objects	218
219	Insight Direct	Mail Order	320-321
040	Intergraph Corporation	Imagineer	13
058	Lotus Development Corporation	Lotus SmartSuite	46-47

Advertisers' Index PRODUCTS

Reader Service

No.	Company	Product	Page
006	Luckman Interactive	Web Commander	131
009	Luckman Interactive	Yellow Pages	133
299	McAfee Associates, Inc.	WebScan	180
058	Micro Focus	Programming Tools	5
*	Micrograph	ABC Graphics Suite	67
214	MicroHelp Inc.	Uninstaller	96
*	Microsoft	Microsoft Project	2-3
148	Primavera Systems	Suretrak 1.5 and P3	62
043	SPSS, Inc.	Statistical & Windows Software	309
308	Symantec Corporation	Norton Antivirus and Norton Utilities	18
*	Visio	Visio 4.0	226-227
250	Visual Software	VRIL	392
163	Xerox Corporation	Textbridge	28

SPREADSHEET/TEMPLATES

*	Lotus Development Corporation	Lotus SmartSuite	46-47
---	-------------------------------	------------------	-------

STATISTICAL SOFTWARE

043	SPSS, Inc.	Statistical Software	309
-----	------------	----------------------	-----

UTILITIES

240	ESRI	Map Objects	218
006	Luckman Interactive	Web Commander	131
009	Luckman Interactive	Yellow Pages	133
214	MicroHelp Inc.	Uninstaller	96
308	Symantec Corporation	Norton Antivirus and Norton Utilities	18

VERTICAL MARKET SOFTWARE

240	ESRI	Map Objects	218
-----	------	-------------	-----

VIDEO GRAPHICS/BOARDS

WIN 95

032	3D/Eye Inc.	TriSpectives	240
064	Advanced Logic Research	PCs	261
162	American Power Conversion	Back UPS Pro	252
020	Apricom	Memory	237
055	Avery Dennison	Avery Labels	254
*	Bodight	Presentation Electronics	268
029	BusLogic	FlashPoint LT	289
*	Claris Corporation	FileMaker Pro	302-303
364	Computer City	Notebooks, Desktops, Peripherals	266
017	Connectix	Color QuickCam	265
011	Corel Corporation	Xara	255
103	Corel Corporation	Stock Music Library	287
*	Crosstalk/Attachmate	Crosstalk for Windows	244
*	Dell Computer Corporation	200 MHz Dell Dimension XPS PRO 200	284
090	Everex Systems	Systems	288
026	Graphsoft, Inc.	MiniCad 6	294
067	Helix Software Co.	Hurricane	301
143	Hitachi	Monitors	262
390	In Focus Systems	LitePro 580	239
002	Iomega Corporation	Zip	229
170	KDS USA	Monitors	274
*	Logitech	MouseMan	249
072	Macromedia	Freehand-Win	278-279
365	Manugistics Inc.	Statgraphics	297
344	Mapping Information Systems	Desktop Mapping	236
068	Maximus Computers	PCs	257
175	Memory Express	Memory	277
004	MGI Software	Graphics	228
317	MicroField Graphics	Electronic Whiteboard	272
054	Mitsuba Corporation	Desktops & Notebooks	276
280	Mitsubishi Electronic America, Inc.	Monitors	292
078	NewSoft, Inc.	Presto! PageManager	269
393	Peachtree Software	Complete Accounting	234
171	PictureTel	PictureTel PCS	271
188	Pipeline USA	Pipeline USA	293
193	Play Inc.	Snappy	231
131	Portrait Display Labs	Pivot 1700 Monitors	296
290	ProCD	Select Street Atlas	250-251
264	ProGen Systems	Systems	304
*	Publishing Perfection	Mail Order	285
030	Smith Micro Software, Inc.	HotFax	300
053	Swan Technologies	Desktops & Notebooks	232-233
112	TDK Systems Inc.	PC Card	295
066	Tiger Software/BLOC Publishing Corp.	PCs and Software	258-259
*	Toray	CDROM	305
003	Truevision, Inc.	Bravado	299
*	US Robotics Inc.	Telephony	242-243
284	Verisoft	Remove-It	264
243	Viagrafix	Design CAD	241
065	VisionTek	Memory Chip Upgrades	283
052	VocalTec Inc.	Internet Phone	280
018	XI Computer Corp.	PCs	291
*	Xircom	Modems	246-247

WINDOWS SOFTWARE

252	Adobe Systems Inc.	Adobe PrintGear	211
240	ESRI	Map Objects	218
299	McAfee Associates, Inc.	WebScan	180
058	Micro Focus	Programming Tools	5
*	Micrograph	ABC Graphics Suite	67
214	MicroHelp Inc.	Uninstaller	96
*	Microsoft	Microsoft Project	2-3
047	PC Connection	Windows Software	328
148	Primavera Systems	Suretrak 1.5 and P3	62
083	ProComm Plus	ProComm Plus for Window 3.0	220
043	SPSS, Inc.	Windows Software	309
*	Visio	Visio 4.0	226-227
250	Visual Software	VRIL	392

WORD PROCESSING SOFTWARE

*	Lotus Development Corporation	Lotus SmartSuite	46-47
---	-------------------------------	------------------	-------

WORKSTATIONS

*	Hewlett Packard	HP Vectra 500 PCs	117
*	Hewlett Packard	HP Vectra PCs	76-77

For Additional Categories see MARKETPLACE PRODUCT INDEX PAGE 350.



Coming Up

Pentium Classic: Still the One

The Pentium processor may not be the only available choice to power today's mainstream PCs, but it definitely holds the lion's share of the market. The reasons behind its success are simple: The Pentium is widely and readily available, it effectively balances price with performance, and it provides more than enough power to handle today's Windows 95 applications. In this roundup of 101 Pentium PCs, we look at both midrange and high-end Pentium and Pentium-equivalent business-oriented machines from 50 vendors. We test PCs under Windows 95 using both 16-bit applications and our new 32-bit test suite, ZD Winstone 32.

3-D: Coming Atcha

The big buzz for PC gamers this year is the impending explosion of affordable, 3-D-capable graphics accelerator cards and the titles to go with them. But these cards will do more than just enable more realistic-looking shoot-'em-ups: Business software programmers can use 3-D to make applications more intuitive, and Web site developers can create immersive three-dimensional "home worlds" to replace flat home pages. In this look ahead at the coming technology we explain the terms, demystify Microsoft's DirectX mandate, and show you what you can expect from the crop of \$200 graphics cards come Christmastime.

High-End Graphics Accelerators

For PC professionals with more immediate needs, we review ten high-end graphics cards that deliver top-flight features and performance. Our first group of reviews compares 2-D accelerators aimed at graphics, DTP, and 2-D CAD users. Then we examine the newest OpenGL-compliant cards that accelerate 3-D video for workstation-level CAD, modeling, and animation tasks.

3-D Home-Design Software

Building or remodeling a home can be agonizing. To help you make things a little easier, we review the five major Windows-based 3-D home-design packages. These CAD-style tools let you draft a virtual home in a flat, 2-D plan, then give you a rough idea of how it will look in real life. We evaluate each for its overall features and usability.

Enhanced Windows 95 Help

WinHelp 4.0, the new version designed for Windows 95 and shared with Windows NT 3.51, has a new look and quite a few new features. We explore the highlights of these features and take a look at five of the help design tools that support them.

Editorial Product Index

Reader Service No.	Product	Company	Page
413	Adobe PhotoDeluxe	Adobe Systems Inc.	73
441	Adtran ISU Express	Adtran Inc.	163
462	America Online	America Online Inc.	103
424	Ascentia J	AST Research Inc.	78
404	Bigfoot	Quantum Corp.	56
449	Borland C++ Developer's Suite 5.0	Borland International Inc.	225
416	CBTutor Financial Series	CBTutor Worldwide	74
463	CompuServe	CompuServe Inc.	114
429	CorelVideo	Corel Corp.	50
418	CorelWEB Designer	Corel Corp.	74
469	CyberMaxx 2.0 Head Mounted Display	VictorMaxx Technologies Inc.	388
450	Dataproducts Typhoon 40	Dataproducts Corp.	192
472	Descent II	Interplay Productions	393
402	Dispatch for MCI Mail, Version 2.0	Common Sense Solutions	54
421	EndNote Plus 2.1	Niles & Associates	74
414	FormFlow 2.0	Symantec Corp.	73
434	Gateway 2000 Destination D5-166	Gateway 2000	39
423	HiNote Ultra II	Digital Equipment Corp.	78
451	HP LaserJet 4MV	Hewlett-Packard Co.	193
451	HP LaserJet 5M	Hewlett-Packard Co.	193
451	HP LaserJet 5Si MX	Hewlett-Packard Co.	193
432	HP Pavilion 7130P	Hewlett-Packard Co.	41
435	In Full Bloom: Great Home Gardens	Hearst New Media & Technology	74
417	Insync CoSession Remote, Version 7.0	Artisoft Inc.	74
426	IrisPen Executive	Image Recognition Integrated Systems	63
442	ISDN*tek CyberSpace Internet+Plus Card	ISDN*tek Inc.	166
401	Jammer Professional	Soundtrek	56
447	The Java Developer's Kit, Version 1.0	Sun Microsystems Inc.	224
955	LANexpress 4000	Microcom Inc.	NE24
452	Lexmark Optra Lxi+	Lexmark International Inc.	200
452	Lexmark Optra R+	Lexmark International Inc.	200
430	Maxmedia TV/Pro II	Umax Technologies	51
415	Microsoft Complete Gardening	Microsoft Corp.	74
431	Microsoft Exchange Server 4.0	Microsoft Corp.	48
465	The Microsoft Network	Microsoft Corp.	118
443	Mitsubishi NetViper	Mitsubishi Electronics America	170
412	MLi Free-D FD-02 Unidirection Multimedia Microphone	MIDI Land Inc.	73
444	Motorola BitSurfr Pro	Motorola Information Systems Group	170
407	Netscape Navigator Gold 2.0	Netscape Communications Corp.	44
433	NetTV WorldVision 2900	NetTV Inc.	40
453	Okidata OL 1200/PS	Okidata	210
409	OptiPlex	Dell Computer Corp.	73
411	Powerdesk	Microhelp	73
420	PowerView 820	InFocus Systems Inc.	74
464	Prodigy	Prodigy Services Company	130
454	QMS 2425Ex Print System	QMS Inc.	212
454	QMS 3825 Print System	QMS Inc.	212
403	QuickBooks Pro 4.0 for Windows	Intuit Inc.	54
415	Reader's Digest Complete Do-It-Yourself Guide	Microsoft Corp.	74
427	Sceptre CD-1112T LCD	Sceptre Technologies Inc.	63
956	Shiva LanRover/E 4.0	Shiva Corp.	NE23
471	Sid Meier's Civilization II	MicroProse Software Inc.	393
405	SolidWorks 95	SolidWorks Corp.	60
410	Starfish Internet Utilities	Starfish Software	73
448	Symantec Café 1.0	Symantec Corp.	39, 225
467	Terra Nova: Strike Force Centauri	Looking Glass Technologies	387
445	3Com Impact	3Com Corp.	177
422	3D Fax 2.0	Infomaging Technologies Inc.	78
422	3D FaxScan	Infomaging Technologies Inc.	78
406	TranXit Pro	Puma Technology	44
446	U.S. Robotics Sportster ISDN 128K	U.S. Robotics Inc.	181
951	VBVoice, Version 1.2	Pronexus	NE10
468	VFX1 Headgear Virtual Reality System	Forte Technologies Inc.	388
470	Virtual i-glasses	Virtual i-O Inc.	388
953	Visual Voice, Pro Version 3.0	Artisoft Corp.	NE18
952	VoiceBox, Version 3.1a	Parity Software Development Corp.	NE13
954	VoysAccess Version 1.2 for Visual Basic	VoySys Corp.	NE20
419	WebSite Maker	THISoftware	74
425	WinBook FX	WinBook Computer Corp.	78
466	WOW! from CompuServe	CompuServe Inc.	140
455	Xerox DocuPrint 4517mp	Xerox Corp.	215
455	Xerox 4520mp	Xerox Corp.	215
428	Yamaha YST-M15 Speakers	Yamaha Corp. of America	51

NE—Network Edition.

To obtain the Network Edition of *PC Magazine*, call Circulation at 800-289-0429.

Abort, Retry, Fail?

THE LIGHTER SIDE OF PERSONAL COMPUTING

By Don Willmott

Crassified Intellitrance

"486 Packer Barrel computer with monitor, CD-ROM, dual HD, \$650."—*THE CHICAGO TRIBUNE*

Why We Really Miss ABBA

Swedish supergroup Ace of Base has a song on its latest album called "Strange Ways." Among the lyrics is this excruciating stanza: "God bless you for being / by my side when I fell through / You could hear me you've got / Internet gateways through my world."



This Squelling Checker Really Squinks

Faithful reader Glenn Gruner reports this spell-checker fiasco. Before: "Ford is changing their quality support functions from SQIs and SQAs to SQEs." After: "Ford is changing their quality support functions from Squish and Squash to Squeal."



Traveling  Software CEO Mark Eppley, the man who brought you LapLink, promotes the new Windows 95 version by dressing up like a mountaineer and playing an impromptu "air ski pole" concert. Whatever works, Mark.

degree & 2+ yrs. experience
wing: ★ Client/Server Database
★ Internet tools (JAVA)
★ Win 32
★ Windows NT
★ Windows 95
★ Disturbed Computing
★ Borland Delphi
★ UNIX
★ PowerBuilder
★ MS VB
★ MS Access
★ C++
ward resume to: Micro Computer

 Do you have the right stuff for this job? (*The Louisville Courier-Journal*)



 ARF on the Road: Myrtle Beach, South Carolina. Must be Bill Gates's new vacation bungalow.



RICHARD TENNANT

If your entry is used, we'll send you \$50 and a *PC Magazine* T-shirt. Send your entries to Abort, Retry, Fail?, *PC Magazine*, One Park Ave., New York, NY 10016-5802 or via e-mail (text items only) to don_willmott@zd.com. Winners this issue: Stephen Deschenes, Glenn Gruner, Brad Poulter, Craig Rigenstrup, and Robert Schmidt.

DELL LATITUDE
Dependable Notebooks
With Superior Battery Life

DELL® LATITUDE™ XPI P120D
120MHz PENTIUM® PROCESSOR

- 10.4" Dual Scan Color Display
- 8MB RAM (40MB Max RAM)
- 256KB L2 Cache
- 540MB Removable Hard Drive (1.2GB Max)
- Smart Lithium Ion Battery with Advanced Power Management
- 32-bit Local-bus Video, 1MB Video RAM

- 2 Type II/1 Type III PCMCIA Slots
 - 6.2 Pounds
 - Optional Dell Latitude DeskDock™ Station Available
 - Extendable 1 Year Warranty*
 - *Double your RAM to 16MB for only \$299 more.*
 - *Free Executive Attache with purchase while supplies last.*
- Business Lease: \$89/Mo.
Order Code #800036

Our Pentium Chip-based
Latitude XPI

\$2399



ROAD TESTED.

Recently, Stephen Taylor of North Carolina accidentally backed his car over his Dell Latitude XPI notebook. Don't ask. These things happen.

But as amazing as it may seem, his Dell Latitude notebook booted up immediately

and sustained only minor damage. Which all leads to the moral of this incredible story: if you really want a notebook that can stand up to the daily rigors of the real world, get a Dell Latitude.

Because not only are Dell Latitude notebooks powerful and affordable. They also seem to be virtually indestructible.



DELL®

TO ORDER, CALL

800-626-4388

In Canada,* call 800-839-0148
Mon-Fri 7am-9pm CT • Sat 10am-6pm CT
Sun 12pm-5pm CT • <http://www.dell.com/>

Keycode #04256

DELL DIMENSION
Reliable PCs For
High Performance
Computing



DELL DIMENSION™ XPS P166s
166MHz PENTIUM® PROCESSOR

- Mini Tower Model
- ★ **16MB SDRAM Memory**
- 256KB Pipeline Burst Cache
- 1.6GB Hard Drive (10ms)
- 15LS Monitor (13.7" v.i.s.)
- 9FX Motion Graphics Accelerator with 2MB VRAM
- ★ **8X Multi-session EIDE CD-ROM Drive**

- MS® Office Professional with Bookshelf for Windows® 95
 - Integrated Sound Blaster 16 Sound
 - Altec Lansing ACS-5 Speakers
 - Microsoft® Windows 95/30 Days Free Support/MS Mouse
 - ★ **3 Year Limited Warranty†**
 - ★ **Upgrade to the Dell 17LS monitor (15.7" v.i.s.) for only \$270 more.**
- Business Lease*: \$94/Mo.
Order Code #500254

The new
Dell Dimension
XPS P166s

\$2549

PC
CLIPPING
LIBRARY

GET THE MOST INCREDIBLE MEMORY EVER.

(JUST TO BE SAFE, WRITE DOWN OUR PHONE NUMBER.)



Dell's featured computer artist is Diane Fenster of Pacifica, CA.

It's the memory of the future: Synchronous Dynamic RAM (SDRAM to you). And this new Dell Dimension XPS has it. Finally, your PCs won't be held back by the limitations of asynchronous EDO memory. Finally, with everything tied to the same clock, you can get smooth, predictable performance at astonishing speeds. Finally, you can have a hedge against obsolescence. And, the technology once reserved for high-end workstations can be on your desktop. So check out the specs, limber up your dialing finger and give us a call. Come to think of it, maybe you should tie a string around that finger first.

DELL®

TO ORDER, CALL

800-626-4384

In Canada* call 800-839-0148
Mon-Fri 7am-9pm CT • Sat 10am-6pm CT
Sun 12pm-5pm CT • <http://www.dell.com/>

Keycode #04255



Designed for

Microsoft®
Windows®95